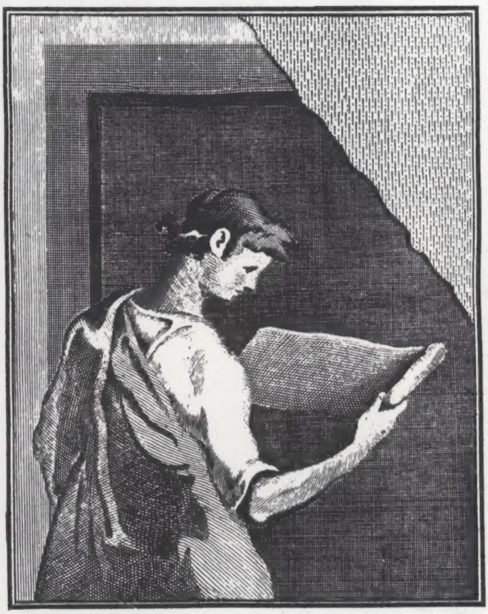
RUFUS KING.



ILLUSTRATED

Annual Register

OF

RURAL AFFAIRS,

FOR

1867-8-9.

WITH 400 ENGRAVINGS.

VOL. V.

ALBANY:

LUTHER TUCKER & SON.

1884.

LOSSING-BARRITT, N.Y.

RURAL AFFAIRS:

A PRACTICAL AND COPIOUSLY

ILLUSTRATED REGISTER

OF

RURAL ECONOMY AND RURAL TASTE,

INCLUDING

COUNTRY DWELLINGS, IMPROVING AND PLANTING GROUNDS,
FRUITS AND FLOWERS, DOMESTIC ANIMALS,

AND ALL

FARM AND GARDEN PROCESSES.

By J. J. THOMAS,
AUTHOR OF THE "AMERICAN FRUIT CULTURIST," AND "FARM IMPLEMENTS,'
ASSOCIATE EDITOR OF THE "CULTIVATOR & COUNTRY GENTLEMAN."

VOL. V.
FOUR HUNDRED ENGRAVINGS.

ALBANY, N. Y.
LUTHER TUCKER & SON, 395 BROADWAY.
1884.

CHARLES VAN BENTHUYSEN & SONS,
Printers, Stereotypers and Binders.

RURAL AFFAIRS.

BY JOHN J. THOMAS.

PUBLISHED BY LUTHER TUCKER & SON, ALBANY, N. Y.

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RABBITS AND THEIR MANAGEMENT.—*Nine* Engravings

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THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.

THE CULTURE OF THE GRAPE.

IT IS NOT WITHOUT REASON that the Grape is assuming a prominent position among the most valuable kinds of fruits, in the estimation of so many cultivators. To say nothing of its culture under glass, the out-door plantation is beginning to furnish a supply of the finest and most wholesome fruit, throughout the entire autumn and winter months. New varieties are rapidly coming into notice, which are still further extending this period, and it is not improbable that before the next twenty years have elapsed, early ripeners will be found which shall begin the supply by the middle of summer. Improvements in the mode of keeping the fresh fruit will doubtless prolong a full supply late into spring.

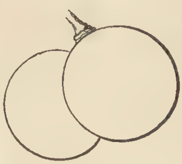
The apple now stands first among all fruits for general value. It gives us, with comparatively little care, fresh fruit through every month of the yearly circle; or as Beecher expresses it, "it belts the year." Good pears can be obtained with difficulty for more than six or seven months; small fruits only for a few weeks during the summer, and peaches and plums for only about two months in the northern states. The pear can only precede the grape in importance in those few localities where it succeeds in the greatest perfection. In other places the grape can scarcely fall behind the apple. It has one great advantage over most fruits grown on trees—the cold of winter never destroys the fruit-buds unless the vine itself is killed. The latter need never occur, as the vine is so easily prostrated and thinly

covered. The fruit-buds being always borne by the present year's shoots, the only casualties which can happen are those rare ones which injure or destroy the crop at a subsequent period.

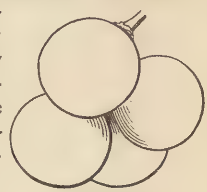
There is a seeming drawback—but a real advantage. The vineyard will not flourish under entire neglect—it must receive yearly cultivation and pruning. This can not fail to prove an eminent advantage, by breaking up the false notion which so many have entertained, that fine fruit, which is the finest crop of the land, is the only one which is to be raised without the least care or cultivation whatever. When the land-owner learns that his grapevines must receive at least a share of the same attention and labor which is given to Indian corn, carrots and cabbages, he will be willing to bestow better management upon his apple, pear, and peach trees. In this way the grapes, like the dwarf pear, by the necessity which it imposes, will become an educator in horticulture.

Varieties.

Among the varieties for succession which we already possess, the Hartford Prolific is one of the earliest, and at present one of the most valuable. It begins the supply at the north about the first of autumn; and further south some weeks earlier.—Dr. Grant's Israella is a better grape, and ripens very nearly the same time, but needs further trial. The same is true of the Adirondac—(fig. 1.)—There are several other varieties of considerable promise, both for earliness and good quality, some of which have ripened much before the three sorts mentioned. Immediately succeeding these are the Delaware, (fig. 2,) Iona, (fig. 3,) and Creveling—which are followed in turn by the Concord, Diana, (fig. 4,) Rebecca, (fig. 5,) Isabella and Catawba. The four last are excellent keepers — especially the Diana, a quality much favored by the thickness of its skin. The Concord, so far, exceeds all others for its general hardiness—both in resisting the cold of winter and the diseases and insects to which some other more delicious sorts are liable. On this account it succeeds admirably throughout the Western States. It does not stand high enough in quality to give general satisfaction; and it will ultimately, probably not very soon, be superseded. Some of the large black varieties among Rogers' Hybrids,

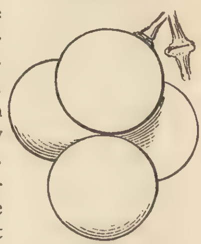


1.—*Adirondac.*

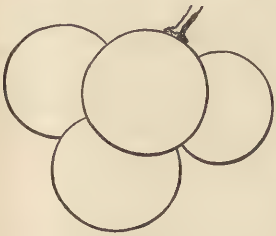


2.—*Delaware.*

3.—*Iona.*



4.—*Diana.*



5.—*Rebecca.*

are better in flavor—but time will be required to prove whether they will nearly approach it in general hardiness.

A few more years will be required to determine the position on the list of excellence and value of several other promising sorts.

6.—*Union Village.*

Propagation of the Grape.

The facility with which the grape emits roots on its young stems and the rapidity of its growth renders it one of the most easily propagated of all bearers of fruit. The new shoots, buried before mid-summer, with a few inches of permanently moist earth, do not fail to throw out plenty of young fibres from every buried joint the first season. Cuttings and single buds, under favorable circumstances, will root with equal certainty.

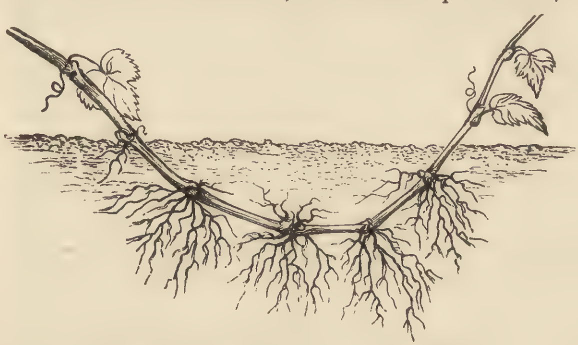


Fig. 7.—*Grape Layer, the roots formed.*

Layers—*Summer Layering.*—Layering is the easiest and most certain, but not the most rapid mode of propagating the grape. It may be done on a small scale, for amateur purposes, without any special preparation, by using accidental or straggling shoots, or those purposely left near the foot of the vine. Usually a little before mid-summer these shoots will have hardened sufficiently to prevent the rotting which might occur if buried too soft or green. Extend the shoot on the ground in order to determine the most convenient spot for excavating under the centre. Then make a small hole or depression with the spade, bend a shoot into this hole and cover it with a few inches of earth as shown in the above figure, (fig. 7.) The surface of the ground must then be kept clean and

mellow for the purpose of preserving moisture in the soil; and should the season be a very dry one, the surface should be mulched,—that is, covered with a few inches of fine grass or short straw. If the shoot is a strong and thrifty one and grows well at its extremity out of ground, every joint will emit a profusion of roots, before the end of autumn presenting the appearance shown in fig. 7. The layer may then be taken up by cutting it loose from the vine and shortening back its extremity, and then by setting a spade far under it, lifting the whole out of the ground. It is then cut in two and forms two strong plants as shown in fig. 8. These

Fig. 8.—*Grape layer, separated into two plants.*

layers may be then heeled in or covered with earth for the winter, giving some protection from freezing by covering the surface with manure or leaves, or they may be packed for the winter in boxes of damp moss in the cellar.

Spring Layering.—As layers, like unmolested runners on the strawberry, exhaust the main plant, they should be taken very sparingly from bearing vines. When they are required in large numbers, vines should be planted specially for this purpose—the soil to be made very rich and well cultivated, so as to produce a strong growth of shoots—unlike the moderate fertility required for bearing crops. The spaces between these vines should be six or seven feet; and generally two or three years are required, in connection with cutting back to two or three buds, and training one or two shoots to upright stakes, before the canes become strong enough to layer profitably. When this is the case, begin the work late in spring, about the time the buds open, by laying down the strongest cane of the two into a smooth straight trench made for the purpose, about five inches deep. The cane selected should not be less than eight or ten feet long, but so much of the end should be cut off as to leave only strong buds, the remaining part not being more than six or seven feet long. With short-jointed varieties it should be less in length. It is held in this position by pegs or stones. The object being to obtain a strong shoot at each eye, the

end should not be bent up which would draw the growth off in that direction. As soon as the new shoots have grown a few inches, the prostrate vines should be slightly covered with earth, which is to be increased as the growth advances. A more perfect way is to sprinkle a little compost along the cane and then fill the trench a few inches with loose damp moss. This will preserve a proper humidity and afford sufficient light to the starting shoots After they have become well hardened the moss is removed and mellow soil substituted. The earth if applied too early, might induce rotting in the young stems. Fig. 9 represents the appearance of this process

Fig. 9.—*Shoots springing from a layered stem.*

after the shoots have attained a full season's growth and rooted well at the bottom, but a greater number is exhibited than should be allowed to grow except on very stout, short-jointed vines. Usually about half a dozen plants are a sufficient number to raise from one cane; more will start, but they should be rubbed off to give strength to the remainder. When a part out-grow the others, they should be pinched back to equalize the growth. This process is repeated for successive years; but as it tends to exhaust the main plant it is advisable to suspend it occasionally for a year if the vigor becomes diminished.

10.—*Newly formed layer-plant.*

These new plants are well rooted before winter; and should be taken up, separated, and packed away as already described. Fig. 10 represents one of these new plants.

It will be observed that while these new plants were forming from the layered cane, one, two, or three shoots, according to the strength of the plant, should be trained to a stake for next season's work, the cane having been properly cut back for this purpose.

Cuttings in Open Ground.—This is sometimes an easy mode of raising plants, but is generally uncertain and often unsuccessful. Much depends on the character of the soil for retaining moisture, and still more on the humidity of the air which varies in different localities, and with seasons. A

rich, moderately compact, deep and mellow soil, is required. It is especially important that it possess fertility in order to give the young plants a strong impetus the moment new roots are emitted. Shoots of one season's growth are selected, of full medium size, omitting small or unripe portions. Where the winters are severe, this wood should be cut off late in autumn, shortened to convenient lengths, and packed in slightly moist earth, or what is much better, in damp moss, in boxes, placed in a cellar. Sometimes the cuttings are placed in a bed in autumn, which answers well in mild climates, or where they are well protected during winter, with a thick layer of straw, manure or leaves.

Fig. 11. *Grape Cutting.*

The cuttings are usually made about seven or eight inches long, and each one should have two or more buds. It should be pared away by a sharp knife immediately below the lower bud and about an inch above the upper one, as shown in figure 11. A trench (fig. 12,) is made with the spade next to a line, nearly perpendicular on one side and sloping on the other. The cuttings are placed upright against the steep side, about three inches apart, so that the upper bud shall be about an inch below the level surface. Fill the trench to the upper bud by adding successive portions, pressing each firmly with the foot, but leaving the soil more loose and mellow above. After the shoots have grown a few inches the surface may be levelled by burying the upper bud an inch beneath it. Some cultivators are more successful by covering the surface with an inch or two of fine manure for the retention of moisture in the soil.—Roots will be emitted from both buds, and handsomer plants will be formed by cutting off the lower part, leaving the roots of the upper bud only to remain.

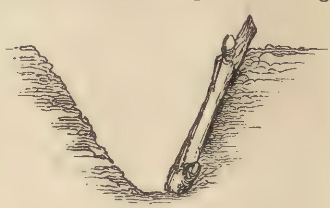


Fig. 12.—*Mode of planting cuttings.*

Fig. 13.—*Mallet Cutting.*

Fig. 14.—*Shield Cutting.*

MALLET CUTTINGS, (fig. 13,) are more successfully employed with some varieties, as for example, the Delaware, which do not root freely in the common way. They may be also sometimes taken with advantage from old vines where pruning has been neglected, and the shoots are smaller. They consist in

taking about one foot of the one year's shoot, and two or three inches of the older wood at the base. A modification of this mode, but less perfect, consists in cutting off with the shoot at the base, a small piece of the old wood as shown in fig. 14. The advantage of these modes consists in the greater number of buds at the base of each shoot, and the nutriment and support afforded by this wood, until the new roots are formed

PROPAGATION FROM SINGLE BUDS.—The various modes of propagating the vine from single buds, admit the rapid multiplying of numbers required for work on a large scale; but artificial heat is always necessary, either on a small scale, in hot-beds, or more extensively in propagating houses.

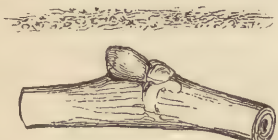


Fig. 15.—*Single bud cutting.*

Good, strong, well ripened wood of of one year's growth must be cut in autumn, and secured for winter as already described. The work of forming or planting the buds or eyes is usually done in March; and being inserted through the month by successive portions, the work of repotting and afterwards setting out into open ground, may be also performed successively without crowding all the work into one period. It should not be done much later than early in April, when warm weather without may prevent the operator from giving the low temperature to the house, required for the leaves and shoots during the early stages of growth.

Fig. 16.

The operation should be commenced by trimming the wood which holds the eyes, into proper form—throwing them into water to prevent drying, until enough are prepared for setting in the beds or pots. Different modes or forms are adopted for these cuttings. A common mode, shown in fig. 15, consists in simply cutting the vine on each side of the bud, leaving the whole not more than an inch and a half long. Sometimes scraping the rough bark from beneath, or shaving off one-third of the lower part of the wood as in fig. 16, facilitates the protrusion of roots. Another is to leave the wood longer and cut off a slice below, as in fig. 17, and still another is shown in fig. 18, where the vine is pared wholly away

Fig. 17.

closely below the bud and about an inch left above it. In all these instances the buds are placed in the positions shown in the cuts. There may be some preference to each of these forms, with different varieties or under different circumstances, but they are comparatively non-essential, much more depending on good after-management. On the whole, however, one of the best modes for general practice is represented in fig. 19, the cut being about two and a half inches long, with the bud at the upper end about a fourth of an inch from the top.

Fig. 18.

When hot-beds are employed in giving bottom heat, the cuttings are usually placed in pots; but in the more common practice of employing propagating houses, they may be placed either in pots, shallow boxes, which have been well soaked in lime-wash some months before to prevent the formation of mould or fungus, or directly in beds about three inches deep over the hot water tanks in the house. The best material for receiving the buds is clean, pure building or lake sand, which is to be kept at all times at a uniform degree of moisture, but never *wet*. It is the practice with some to place a stratum of prepared soil (hereafter described) an inch beneath the wood for the reception of the new roots, and sustaining the young plants for a longer time than sand alone—thus obviating so early a removal into pots, as would otherwise be required. Each bud or eye need not occupy more than two square inches of surface. When properly imbedded in the sand, a moderate heat should be at first applied, not higher than 50°—the object being to commence roots before sufficient warmth is given to expand the leaves. For this purpose also, the temperature of the air in the house, should be kept at all times at least ten degrees lower than that of the sand. In a few days from the commencement, the heat may be gradually raised, and as the leaves expand, it may be cautiously increased to eighty

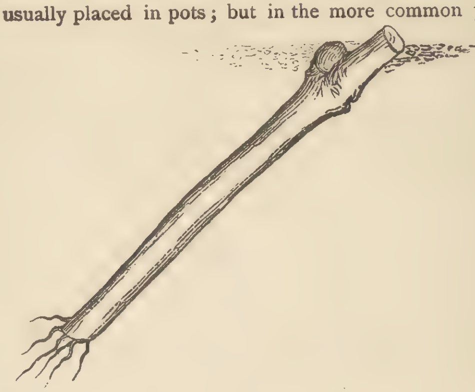


Fig. 19.

and ninety degrees. It is of great importance to avoid the checks given by sudden changes, from cold currents of air, cold water, or remitting fire.

When the roots have reached three or four inches in length, the plants should be potted off into a soil prepared for this purpose, by mixing about equal parts of clean sand and rich, rotten turf, or leaf mould in the place of turf. This mixture should be prepared several months beforehand, and be thoroughly pulverized and the parts mixed together; and unless the turf is quite rich, the addition of about one-fourth of rotten manure would be advisable. About a thirtieth part of wood ashes improves the mixture. Plenty of water should be given until the plants become established in their new home. When the roots reach the exterior of these pots they may be either transferred to larger ones or to the open ground—which completes the process for the first season.

Fig. 20.—*Root Graft.*

ROOT GRAFTING.—This mode has also been extensively adopted for propagating on a large scale. It is done by taking a portion of the shoot with one bud, as shown in the annexed figure, and inserting a piece of root cut wedge-form into a cleft in the lower end of the cutting. Grafting plasters bind the parts together, but are left open below for the emission of roots. The figure (fig. 20,) represents more fibres than are desirable at first or when the work is performed. Varieties which furnish long, smooth roots, are most convenient, of which the Concord is one of the best. The grafts are placed in shallow boxes (fig. 21,) of a convenient size, or about one by two feet, and three inches deep, and bottom heat given as before described, but less care is required in controlling the temperature.

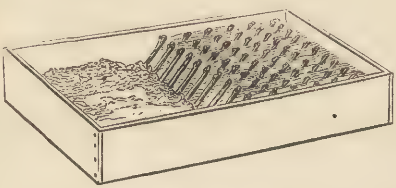


Fig. 21.—*Box of grafted roots.*

GRAFTING IN OPEN GROUND.—Large vines, and vineyards of undesirable sorts, are sometimes changed to better, by grafting. It is uncertain of success, at best, although the grafts when they do not fail to grow, push with great vigor and frequently extend twenty feet or more in a single season. There are three different modes; one is to graft early in spring down into the root; the second is to defer the work until the buds swell and bleeding ceases; preserving the grafts in a dormant state in a cool place. The third, and generally the most successful, is grafting in autumn, according to the mode described in Fuller's Grape Culturist. A cleft graft is made at or near the surface

of the earth and the parts firmly bound together. An inverted pot is then plaeed over it and banked with earth, except the top which is covered with six inches of straw, and the whole then buried in earth. This is removed in spring. Grafters generally urge the importance of a coincidence between the bark of the stock and the graft; but Charles Downing states that he has succeeded, with a growth of twenty feet the same season, by sawing off a vine two inches in diameter, boring a hole in the centre and inserting the graft. The operation, however, mostly failed. Grafting in the open air appears to be so easily influenced by so many external causes, as frequently to result in entire failure, even in the most skillful hands.

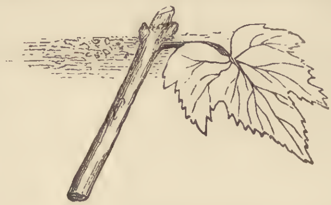


Fig. 22.

GREEN CUTTINGS.—Propagating by cuttings of unripe wood is practiced, when it is desired to increase new sorts rapidly, in connection with common propagation by single eyes. As they do not always mature well, or make strong vines the same season, they are objected to by many propagators. Occasionally however, good strong vines may be obtained. They are made by taking strong shoots in summer, and making them into cuttings like that represented in fig. 22, leaving on the leaf. These are inserted into sand (or the same kind of soil used for single eyes,) as far down as the bud, the leaf resting on the surface. The figure represents the leaf on the wrong side—the cutting should be placed with the leaf on the upper side, so as to clear the surface of the soil better. When small numbers are propagated, pots are used and moisture retained in the leaves by placing them under a glass frame in the progagating house, where the proper degree of moisture is maintained without the excess which would cause rotting. On a larger scale the cuttings are

Fig. 23.—*One year plant.*

placed in the borders of the propagating house, the leaves forming one continuous green surface. These are kept constantly moist by watering them from the watering pot, three or four times a day. In about three weeks they wili be fit to remove to pots, and are then to be treated like other plants. They generally succeed best by being kept in the house during the remainder of the season, the wood ripening better and the vines becoming hardier, than if planted out in open ground, where there is not sufficient warmth to ripen and harden the green wood.

Training.

Young plants should be trained to a single strong shoot, like that represented in fig. 23, for which purpose, a stake should be used and the vine tied up as it advances. Spring plants set out early, will often reach a height of six or eight feet by the end of the season. If neglected, or not trained to a single shoot, they will become sprawling and more feeble, like fig. 24; but may be fitted for proper training, and will do well if cut down to two or three eyes, as in fig. 26.

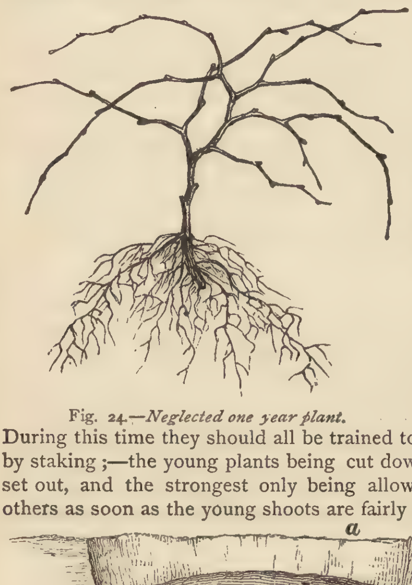


Fig. 24.—*Neglected one year plant.*

Cuttings of the first year's growth, as well as layers, are more perfectly fitted for finally transplanting to the vineyard, by one season's cultivation in nursery rows.—During this time they should all be trained to a single shoot, kept upright by staking;—the young plants being cut down to two or three eyes when set out, and the strongest only being allowed to grow, rubbing off the others as soon as the young shoots are fairly developed. Pinching off the tips occasionally, after they have reached four or five feet in height, will render the shoot and buds stronger, and the wood will ripen better.

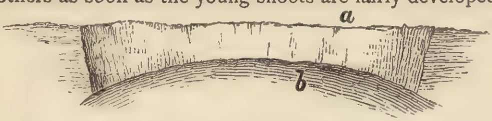


Fig. 25.—*Hole for transplanting.*

Transplanting.—This is effected most perfectly by making a broad hole, and rounding up the central portion of the bottom as shown in fig. 25, where *a* represents the surface of the ground, and *b* the bottom of the hole. The stem being cut down to two or three strong buds, and very long roots clipped off, the plant is placed with the centre on the rounded

surface of earth, and the roots then spread out in every direction, as shown in fig. 26. The hole is then filled with finely pulverized earth, which completes the transplanting.

Fig. 26.

The following is the usual course for forming the plants into bearing vines—three years being required for this purpose, if strong plants are used and good cultivation given. One or two more years are, however, frequently required, if the growth is not sufficiently vigorous :—

FIRST YEAR.—The plant having been cut down to two or three eyes when set out, the strongest is trained to a single shoot, the others being rubbed off. The tip should be pinched off after growing several feet, to strengthen the cane.

SECOND YEAR.—Last year's shoot being cut down to two or three buds, or to a foot or more in height, the same course is to be pursued; but two shoots, instead of one, are to be grown from the two upper buds.

THIRD YEAR.—If the vine is not very strong, cut down these shoots again, and train two new and stronger ones from them, or cut them back part way and raise shoots from the cut ends. If any fruit bunches are produced, remove them early in the season. The best rule to determine whether to cut back again the third year, is obtained from the size of the canes, which should not be less than half an inch in diameter. If fully of this size the trellis may be erected, and the training of the vines upon them commenced.

TRELLIS.—Different modes of constructing trellis have been adopted.

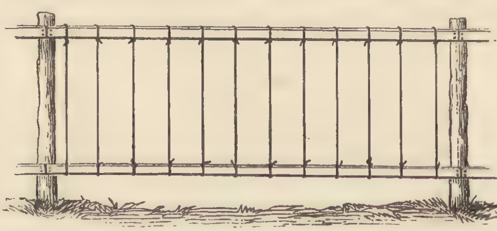


Fig. 27.—*Trellis with upright wires.*

It is not essential which is used, but the cheapest and most durable is to be preferred. Fig. 27 represents the mode recommended and adopted by Fuller. It is about four feet high, and is intended for a single series of horizontal arms with vertical bearing cane, now generally approved. If two series of arms are desired, the height may be increased to seven feet. It consists

of durable posts placed ten or twelve feet apart, to which horizontal rails are nailed, the upper one at the top and the lower one about a foot from the ground. Between these, vertical wires, about a foot apart, are stretched as shown in the figure. These wires being shorter than when stretched horizontally, need not be so large, and a saving is thus effected in the expense. Each bearing cane is trained to one of these wires.

Another mode is to use wires stretched horizontally, as shown in fig. 28.

Fig. 28.—*Trellis with horizontal wires.*

The lowest should be a foot or more from the ground, and to this the horizontal arms are tied; the next may be eight or ten inches above for tying the young shoots, and the two remaining ones, each twelve to sixteen inches higher. These distances are recommended by Strong, in his late work on the Grape.

Cultivators differ as to the size of the wire suitable to be employed. Some use even as large as No. 8, which is one-sixth of an inch in diameter, which is 13 feet to the pound. Others severally employ No. 10, which is 20 feet to the pound; No. 12, which is 33 feet, and No. 14, which is 54 feet to the pound. For the verticle wire trellis, already figured, No. 16 is large enough, which is over 100 feet to the pound. When the smaller wire is used, it should pass through holes in the end post, and be brought around at the side, and the end twisted around the main part. This may be easily done by using a strong, round piece of wood about a yard long, around which the end is brought, and which by using as a roller and lever combined, easily accomplishes or renews the desired tension.

The wire used for this purpose should be annealed, and is best when galvanized. The wires are fastened to the other posts by staples; or easier by two common nails, the lower one a ten-penny, and the upper a six-penny.

Trellis made wholly of wood also answers a good purpose, whether of horizontal bars nailed to posts, or vertical rods nailed to an upper and lower horizontal bar. The latter is the mode adopted by J. Knox, at his celebrated vineyards near Pittsburgh. Wooden trellises are generally found more expensive than those constructed of wire.

TRAINING ON THE TRELLIS.—Whatever mode of training is adopted, the following general rules should be observed:

1. Allow no shoots to grow nearer than about one foot of each other.

2. Cut back each bearing shoot at the close of the season to one strong eye, as near the old wood as practicable, to produce bearing shoots another year.

3. Rub off, as soon as they appear, all shoots not wanted.

These rules may be observed for different modes of training, whether vertical, horizontal or in the fan form; but the following will commonly be found the simplest and easiest in practice.

After the two canes have been formed the third year on the young vine, as already described, they are to be cut off to within about four feet of the base, and spread out in opposite directions horizontally, to form the arms. As buds always tend to break into shoots soonest, when bent back from an upright position, and also from the extremities or tips of the canes, these arms if brought out straight, as in fig. 29, will produce shoots irregularly, the buds on the middle portions of the arms not breaking at all, while the others may have grown several inches. To prevent this difficulty, bend them in curves, as shown in fig. 30—the middle portions being highest, will strike shoots equally with the other parts. As soon as these shoots are well under way, the arms may be brought into a straight horizontal position. If trained to the vertical-wire trellis, each shoot should have its appropriate wire, and all others rubbed off. If the horizontal wire trellis is used, each shoot should be tied to the second wire, as soon as they have grown sufficiently to reach it. This wire being placed nearer the base for this purpose, when the young shoots have reached a few inches above the top of the trellis, they should be kept pinched back to this height, for the rest of the season.—Each one will probably set two or three bunches of fruit, and, if the canes are strong enough, these may be allowed to remain and ripen, and will present in autumn the appearance shown in fig. 31.

Fig. 29.

Fig. 30.

Fig. 31.—*Bearing vine.*

If the vine is intended to be laid down and slightly covered for winter, the pruning may be done at any time after the fall of the leaf. Or if it is desired to use the wood that is cut away for propagating new vines, the pruning should be done before the shoots are severely frozen. As all

pruning in autumn increases the liability to injury by the cold of winter, one or two extra buds should be left on the stump, to be cut down the following spring. If the pruning is not done in autumn, it may be performed at any subsequent period before spring.

Mode of Pruning.—When the young arms are first attached to the trellis, each bud, which is intended to form its upright bearing shoots, will present the appearance shown in fig. 32. After growing one season, as in fig. 31, each shoot is to be cut down to a good bud, as in fig. 33. This bud is to grow and form the bearing shoot for next year. The pruning should be done as closely as practicable to the horizontal arms, provided one good strong bud is left on the stump or spur. After the pruning is completed, the vines, (already represented by fig. 31,) will exhibit the appearance in fig. 34. The vine is now ready to throw up another set of bearing shoots for the coming year. It is the practice of some cultivators, to leave two or even three buds on each spur, so as to form two or three bearing shoots from each, in order to obtain a fuller crop. This is, however, drawing too severely on the vine for continued practice. To maintain the vigor of the vineyard, as well as to obtain large, well-developed, well-ripened bunches and berries, the vines should never be over-cropped; and one shoot from each spur is, therefore, sufficient. The reports which are often made of six, seven and eight tons of grapes from an acre, may be set down as evidences of bad management and over-exhaustion of the vines. Three to four tons per acre, is the largest amount which good and continued success will warrant.

Fig. 32.

Fig. 33.

Fig. 34.—*Pruned vine.*

By raising bearing shoots from the same spur for successive years, this spur will become lengthened several inches, or at the rate of about one inch annually. Although little inconveniences result, it is desirable to keep them short; and for this purpose the spur may be cut back to one of the smaller buds at its base, and a new shoot thus brought out to form the beginning of a renewed spur. As this new shoot springs from a small bud, it should not bear any fruit the same season, but its whole strength given to the formation of wood to furnish next year's bearing shoot.—By selecting each year a small number for this renewal, the process may

Fig. 35.

be going on annually with but little interference with the general crop.—Fig. 35, shows the manner in which this result is effected, the dotted line marking the place where the old spur is cut out on the left, for the benefit of the new shoot on the right.

Summer Pinching.—At every joint of each new shoot is a strong leaf. In the axil (or arm-pit,) of each leaf-stalk, buds are formed, which if allowed to remain will grow into fruiting branches another year. Opposite to each strong leaf is a tendril; or in its place a bunch of fruit, if near the base of strong shoots—tendrils being regarded as abortive fruit-bunches, serving also the purpose of clinging to supports and sustaining the vine. These, it will be observed, are opposite the leaf-stalk and bud. From the axil of the leaf-stalk a new and feebler shoot often springs, which is called a lateral—two of which are shown in fig. 36. Vigorous laterals will sometimes throw out others which are termed sub-laterals. Laterals should be allowed to remain, as displacing them tends to injure or destroy the buds.


Fig. 36. —*Laterals.*

To prevent shoots or canes from growing too long, and also for the purpose of increasing the strength of the cane and its buds, the practice of pinching off is adopted, and is generally performed after mid-summer. This pinching giving a check to the cane, tends to the emission of laterals, which should also in turn be pinched at their tips.

It is a common practice with most cultivators of hardy grapes, to pinch off the shoots as soon as three leaves are formed above the upper bunch of fruit. A less number will be insufficient to furnish food for the forming berries; a greater number of leaves would doubtless be better, provided there is room on the trellis. A good rule in practice is to allow the bearing shoots, shown in fig. 31, to pass a few inches above the top wire, before the tips are pinched off. After pinching, the upper bud will frequently "break," or start into a new shoot—in which case a second pinching should be given, and so on as long as the growing season continues.

Summer pruning consists, in addition to this pinching, in rubbing off all useless shoots when they first appear. Bearing canes should be at least ten inches or a foot apart, and all shoots between them are useless and detrimental, by crowding the foliage, lessening its health and vigor, and drawing strength from the vine. The process of rubbing off is generally begun quite early in summer, or by the time the first shoots are but a few inches in length; and it should be continued or repeated as long as any intruding shoots spring from the vine.

Modifications of Training.—But one mode has been described, namely, that represented in fig. 31. Some cultivators adopt a modification of this plan, by employing a single horizontal arm, extended in one direction only, (fig. 37,) instead of the two arms on opposite sides. This mode

appears to succeed well, and is regarded as simpler than the other. Another mode is what is termed the Thomery system, and is represented in fig. 38. Its object is to cover a higher trellis where the ground is limited, or to extend the vine over the walls of buildings. It obviates the difficulty of two or more horizontal arms, one above the other, on the same vine, by allowing but a single arm from each, as will be seen by inspecting the figure, (fig. 38.)—Double the number of vines are planted along the trellis, and every alternate one carried up to the second tier. A greater number of vines may be planted, and the trellis raised to a corresponding degree.


Fig. 37.

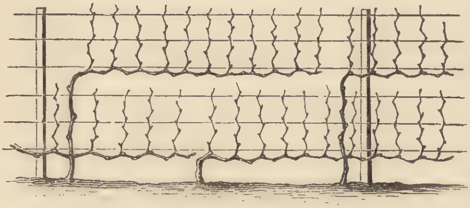


Fig. 38.—*Thomery system.*

Soil for Vineyards.

The long established practice of highly enriching the deep vine borders of exotic grape-houses, formerly misled some cultivators into the practice of heavily manuring the ground intended for vineyards of hardy American varieties. It is now fully proved that land of moderate fertility is much better. Rich soils produce a strong growth of canes and leaves, at the expense of the fruit, and render the wood more liable to winter-killing. A considerable proportion of clay in the soil, provided there is a perfect under-drainage, is better than light sand or gravel. The most successful vineyards are planted along the borders of large open waters, where the soil is composed of what is termed *drift*—giving a perfect natural drainage. The south shore of Lake Erie, from Dunkirk to Sandusky, extending a few miles inland, and the borders of Crooked Lake, in western New York, have proved to be admirably adapted to vineyard culture ; and other places in proximity to open water, away from frequent fogs, and with a loose or shelly soil, will doubtless be found equally good. While such localities as these should be sought for extended or market cultivation, in nearly every portion of the country vines for a family supply may be raised, by proper under-drainage, and the selection of hardy or productive sorts.

At the same time that moderate fertility is to be sought, constant cultivation must be given through the growing season. The best managers pass the cultivator once a week.

The slower growing varieties, such as the Delaware, should have a richer soil than more rapid growers. Grapes on highly manured land will grow larger, and present a more showy appearance—but the fruit at the same time will be more watery, and of inferior flavor.

Distances for Planting.—The European practice of placing the vines about four feet apart, each way, and training to a single stake, has been adopted to a considerable extent. It succeeds best on poor and light soils, and with the slower growing sorts. Although it does well for a few years, it is not to be generally recommended. Young cultivators, also, fall into the error of placing their vines too nearly together, when trained with horizontal arms on a common trellis. They bear and succeed well while young, but as they become older require more room. It is a common practice to place the lines of trellis eight feet apart, and the vines twelve feet from each other, along each line of trellis. This distance appears to answer well; but some of the best managers give at least twelve feet each way, and others as much as sixteen feet. The space thus given, not only tends to a more healthy growth and freedom from mildew, but developes larger, finer, and more perfect grapes.

Keeping Grapes for Winter Use.

The great leading requisite for keeping grapes successfully in winter, is to have them *well ripened*, but not over ripe. When grown on crowded, unpruned, uncultivated vines, they will be small, acid and watery, and will quickly shrivel in a dry atmosphere, and mould and decay in a moist one; and they will soon freeze, if the temperature of the air goes much below the freezing point. But well grown and well-ripened fruit, (resulting from good cultivation and judicious pruning,) contains a rich juice which prevents them from shrivelling, or decaying and freezing, even at a low temperature. Various modes are recommended for packing away grapes for winter. They all succeed well, if good, well ripened fruit is taken, as already mentioned, and are placed in a cool and rather dry apartment, where they will not freeze. If packed in boxes they are less liable to freeze than when exposed. These boxes should not be of pine, as it imparts a resinous flavor. They should, of course, be entirely free from moisture, when packed away. As a general rule, they are not ripe enough, unless the stem which holds them has lost its naturally green color, and has assumed something of the color of the grapes,—which will be somewhat purple in all dark-colored varieties. One of the best of all keepers among American sorts, is the Diana. The Clinton, also, is an excellent keeper. The Isabella, Catawba and Rebecca keep well.

H. G. Warner, of Rochester, who has kept grapes nearly into midsummer, lays down four essential requisites. They must be *ripe*, *clean*, *dry and cold*. They are packed in boxes, containing five, twelve and twenty-four pounds. They are placed in a cellar under his barn, where the temperature is about 28° through winter. Grapes will not freeze at this temperature when kept in boxes. He is careful not to place so many

in each, as to press upon or crush the lower ones. The boxes are nailed up and set one upon another, so as to occupy little room.

Packing Grapes for Market.

None but well grown and well ripened bunches should be taken for this purpose. They should be picked on a dry day, and all imperfect berries removed from the bunch. They should be allowed to dry a few days, which lessens their liability to be broken. After trying many different modes of packing, placing the bunches in paste board boxes, containing a few pounds each, has been found best. No material for packing is put between the bunches, nor around them, but care is required, to place them so that the boxes should be compactly filled. These are then put in large wooden boxes for distant conveyance. Such varieries of the grape as have a tough skin, are least injured by long journeys; while those like the Concord, which are tender, cannot be sent to a distant market without many of the berries being broken, although this liability is somewhat lessened by drying and slightly wilting for a week or two before packing. The Hartford Prolific is packed in quite small boxes, so that the grapes may be taken from them as required for use, as they will not bear much handling. Most other varieties carry well.

E. M. Bradley, of East Bloomfield, N. Y., a skillful marketer, gives the following statement of his management: "While the Grape is a fruit peculiarly constituted to endure an almost unlimited amount of abuse in handling, no other fruit so richly repays every iota of care that may be expended upon it. Thorough pulverization of the soil to a liberal depth every week, during the growing season of the vine, a systematic thinning of fruit, and removing of all superfluous growth, will secure a well matured crop of grapes. As soon as fully ripe, (not before,) the fruit should be carefully picked and laid in shallow, well ventilated drawers, carried to the packing house on a spring wagon, and placed in racks or cribs over registers so constructed as to afford plenty of fresh air, but not exposed to light or artificial heat. Here the fruit may remain for months in safety, and retain its plumpness and bloom perfectly. When desirable to send to market, the drawers are taken from the rack in the store room, and placed upon the tables in the packing rooms, where the fruit is carefully assorted. all green berries and superfluous stems removed, and packed closely in paper pockets or wooden boxes, and immediately shipped. The packing rooms should be well lighted. Small paper pockets, containing from one to three pounds, snugly packed in wooden cases, two dozen pockets in a case, are found to carry the fruit more safely to market than larger packages. The cases should be as nearly air tight as possible. I have sent many tons, packed in this manner, to Charleston, S. C., Nashville, Tenn., Quincy, Bloomington and Dubuque, on the Mississippi River, and many other towns, over equally hazardous routes, with entire safety.—Good grapes, neatly packed in fancy paper pockets, will always sell at

remunerative prices, however much the market may be 'glutted' with fruit put up in a slovenly manner."

The pockets referred to are round boxes, with one-fourth inch wooden bottoms, and pasteboard sides three and a half inches high. Those intended for the finest fruit, are covered with the best embossed and gilt figured paper, lined inside with white, and mounted on top with copper tippings and fancy labels printed in colors. Two dozen of these pockets are packed in a good, tight pine case, making a safe package for transporting any distance. For the corner grocery man who retails grapes by the pound, wooden boxes, containing 25 to 30 lbs. each, answer every purpose.

CURVILINEAR ROOFS FOR GRAPERIES.—This is a form often given to the more highly finished class of grape houses. It possesses some advantages, and when neatly constructed, presents a handsome appearance. But there is another form originated and adopted some years ago by Ellwanger & Barry of Rochester, which is shown in the accompanying cut, and which appears to be a decided improvement. The base walls, on which the frame rests, are perpendicular; and the lower part only of the frame is curved. This form gives it a neater and less heavy appearance, and is more easily and cheaply constructed. It is occupied as a cold grapery, and is seventy feet long, fourteen feet high and sixteen feet wide. Having often admired its external appearance, we present the above representation to our readers.

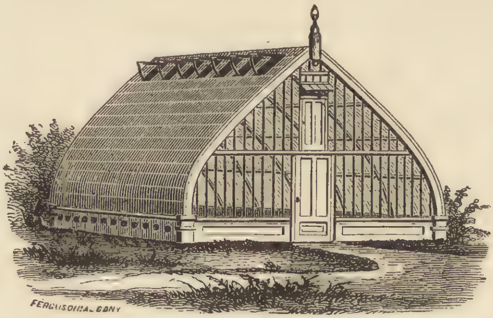


Fig. 39.—*Curvilinear Roofs for Graperies.*

WINTER PROTECTION—COVERING WITH EARTH.—A New Jersey correspondent of the COUNTRY GENTLEMAN, says that in the autumn of 1865, he tried this plan of protection: "I had planted one vine each of Adirondac, Iona, Israella, and Allen's Hybrid; and being very small and frail-looking, I was anxious to give them the best care. I made a mound of earth about two feet in diameter at the base, and fifteen or eighteen inches deep over each vine. Upon uncovering them this spring I found them in fine condition, and now (in May) each one is growing finely."

ABOUT MILK-FARMING:

ITS PROFIT; ITS SYSTEM; AND SOME OF THE PROPER EQUIPMENTS FOR IT.

WRITTEN FOR THE ANNUAL REGISTER, BY DONALD G. MITCHELL,
Author of "My Farm of Edgewood."

WITHIN THE IMMEDIATE NEIGHBORHOOD of any considerable town, where a constant market can be secured, a dairy farm can be put to no more profitable use than by sale of the milk. This involves the expense and toil of no superior 'cheese-woman'—no tugging at the churn on hot mornings, when the thermometer ranges among the nineties—no scouring of pans, and cheese tubs—no anxious watching of the price-current of the city markets. To be sure there is no whey for the fattening of pork; but I think I speak within bounds, when I say that fifteen dollars worth of superphosphate or of bone-dust will make good to the land all the really valuable chemical salts which go away in the milk of twenty-five cows, the season through. Nearness to town, moreover, enables the milk-man to watch his chances of bringing back at small cost, a multitude of fertilizers, which are both out of the knowledge and reach of the back country farmer.

A dairy which, under the present high price of produce, returns one hundred to one hundred and fifty dollars per cow, in either butter or cheese, is counted, if I do not err, an extraordinarily profitable dairy. But with present prices of milk in all large towns, a good cow, well cared for, should return from one hundred and sixty to two hundred dollars. Let us look at the matter a little more in detail:—It must be a poor cow

which under the high feeding that should always belong to a milk dairy, will not give two thousand quarts of milk in a season ; we will say, ten quarts a day for two hundred days, or eight quarts a day for two hundred and fifty days ; this estimate will surely not be reckoned extravagant. For the past two years (and I see no present signs of abatement in price,) milk has averaged in all the eastern cities of from thirty to seventy thousand inhabitants, at least eight cents per quart. At this rate a cow returns one hundred and sixty dollars. But the price to families throughout the winter months has been ten cents per quart, and a good dairy-man should have many a cow in his stables, which will give (with judicious feeding) fifteen quarts a day for the first hundred days after calving—an average of eight quarts per day for the second hundred days, and an average of five quarts for the succeeding sixty-five days. This leaves a margin of one hundred days before calving, and counts up an aggregate of twenty-five hundred quarts. Nor is there any reason in the world why a good dairyman, by adroit selection and careful feeding, should not bring all his cows to this average.

And this brings me to the particular subject in regard to which, the Editors of THE ANNUAL REGISTER, have asked such suggestions as I may be able to furnish. How is a milk dairy to be kept at its best ?—by what choice of stock—by what general management—by what course of feeding ?

THE MILK-FARMER'S HERD.

First of all, the milk dairy-man should abjure allegiance to any one strain of blood ; it will never do for him to swear by the Herd-book, or to have any hobby of race. Here and there, a Short-Horn (at a great price) proves a great milker ; and there are individual Ayrshires who do wonders in the filling of a pail ; the Alderneys, I think, never. Grade animals of good milking points will be serviceable ones for him ; and if he keep his eye open, as every shrewd farmer should, he will find here and there some raw-boned, mis-shapen native animal, who will yield golden returns. Those animals that will give the most milk under generous feeding, without respect to name or lineage, are the animals for him. Therefore, in nine cases out of ten, the best milk herd is very motley in form and color. In an experience of some ten years, with a herd of twenty or more, the three most profitable milkers I have owned, have been a grade Short-Horn, (from Kentucky,) a grade Ayrshire, and a raw-boned native.

No milkman can, I think, raise his own stock to a profit. Cows can be grown more cheaply in the back country, where milk is at five to six cents the quart, than he can grow them for himself. He needs to devote all his care and his food material to the immediate object of his calling. Young animals are a waste and a nuisance to him. He must be inhuman enough to snatch away the calves the moment they are dropped, and never allow the dam to see them—much less to fondle and suckle them. This is doctrine that will shock the optimist, but it is the true one for the milk farmer.

Again, it is doubtful if any animal, unless she be an extraordinary cow, can be kept in a milk dairy for more than five or six years, to a profit. The age at which to buy should not range below five, or above eight, and at thirteen or fourteen, ordinarily, it is time the dairy-man should find another owner—either among those good people who love to pet old cows, or those bad butchers who peddle bad beef. It is hard measure to mete out—thus to turn away what has been proven a valuable animal, and still harder to forego all hope of rearing her progeny. And this leads me to remark, that if the milk farmer can arrange with some grazing farmer in the back country to rear for him his best heifer calves, and to pasture his dry cows, he will find his account richly in so doing. Indeed, fifty acres of fair pasture—at such remove in the country as to count little on the rental, is a capital addition to a milk farm.

It is of course essential upon a dairy farm of this character, that cows should "come in" all round the year; with a herd of twenty-four, for instance, two calves should be dropped a month, if the matter could be so far systematized. Such a suggestion would make a butter farmer stare, who wants his animals to be freshest in their flow of milk, when food is most succulent and abundant, and the temperature most favorable. But a milk farmer must *always* furnish succulent and abundant food, and must always provide an equable temperament.

Winter Feeding.

I come next to the consideration of the feeding of milch cows; and first —of winter feeding. Of course it must be regular, and there must be the utmost cleanliness. There must be no stint, and for all those in a full flow of milk, there must be warm food. It is quite extraordinary, what an effect the temperature of the food or drink has upon the lacteal secretion. Monthly nurses perfectly understand that a woman who has recently become a mother, must be very careful how she ventures upon chilling drinks; but farmers do not so well understand how damaging it is to drive a freshly calved cow into the frosty air of January, for a drink in an icy brook. No milk-man should permit such barbarism. Warm shelter and warm "slop" three times a day, with perhaps an hour of exposure to the sunshine at noon, constitute the proper regimen for a cow in the first flush of her milk.

Water for milch cows in winter, should have as nearly as possible the temperature of the stable in which they are kept—rather higher than lower. If water can be kept on the flow within reach of every cow, so much the better, and in the well-arranged recent dairy barns, this is provided for. The drier the food the more water, of course, the animals will require; but in whatever shape food may be given, water at will, will be of advantage.

Heavy, unctuous ground food, of great fattening properties, is by no means so desirable as the lighter meals which carry a large admixture of bran. Bran itself makes an admirable condiment, so does buckwheat coarsely ground, and brewer's grains, if accessible. A little stirring in of

bone-meal at intervals of a month or two will be desirable—more especially if the cows are fed largely upon roots.

A steaming apparatus, is, I need hardly say, an essential in any complete milk-dairy. There may be a question in regard to the steaming of food for fattening cattle or for growing stock, but for a herd of milch cows there is no room for doubt. The process, moreover, makes available a great mass of coarse material in the way of cornstalks, pea-vines, etc., which would be otherwise unserviceable.

With respect to hay for milk-giving cows nothing is worse than stout timothy, and if the seed be allowed to form, it is but little better than rye straw. Under any system of farming, which looks to the health and good keeping of cattle, it is ruinous to leave timothy until it has taken on that harsh wiry condition, which belongs to its seed-bearing state, but for a milk-farmer such neglect is monstrous. Indeed, I think it may be laid down as a general rule, in ordinary seasons, that the milkman's haying should commence a fortnight before the grazier's, and close a fortnight earlier. What he may lose in weight, he will gain in succulence, and it is this succulence which goes to the promotion of a quick flow of milk. Even tbe hay which most farmers are disposed to condemn as "flashy"—such as rowen—and which is certainly not adapted to the development of muscle or fat, is yet admirably suited to the wants of a milk farmer. If timothy is grown, and on milk farms, I think it should be grown sparingly —it should be cut when it is in the fullness of its purple bloom, and it is far better that it be cut earlier than later. Red-top—(herds-grass, in the naming of many,) makes a good hay for milk, if cut in its bloom; the June grass from old meadows is even better; and best of all—if *judiciously cured*—is clover. (Even before this, if it were enough known to warrant the mention, I should name Lucerne; but a doubt, not yet well settled, in regard to its hardiness in the American climate, forbids unqualified commendation.)

What Roots to Cultivate.

Of the roots which a milk-farmer may grow to a profit, I should rank the mangel wurzel first, the carrot next, and the ruta baga third. If I were suggesting crops for a dairy farm where winter butter was made, I should say, by all means, carrots and parsnips were the best. These latter roots will give both richness and color to the products of the dairy. The mangel wurzel is more succulent, is more easily grown, and, what counts more than all—is as easily harvested as a turnip crop. The great objection—indeed almost the only objection to the carrot crop, in a large way, is the expense of harvesting. Now and then a plowman can be found so deft of hand as to sink the landside of a plow eight inches deep, within an inch or half inch of the rows; but this nicety implies the utmost nicety of drilling, and the two conditions are so rarely mated together, that it is unsafe to count upon a harvesting with the plow.

The Turnip crop (Swedes,) is by no means as sure a crop in this country

as in England, by reason of the hot suns of July, and June which may do it vast damage, and which sometimes may so parch and crust the ground (after a rain) as absolutely to imprison and destroy the bursting germ of the seed. The fly, too, (black flea,) is more persistent in sunny weather, than under the foggy atmosphere of England. Still, a fair average crop may be counted on, and it may be put in after the hurry of spring work is over; it may be put in, even, (as I have demonstrated by successful trial,) after a crop of early June or Dykeman potatoes has been removed; and after early peas with more security. A crying objection has been that it gave a distasteful flavor to the milk. This is true to a certain extent, but it may be defeated in sundry ways. A little sprinkling of nitre in the cans or pans, will destroy this turnipy flavor; or what is better, the cows should be brought to this class of food gradually by giving a few slices, well covered with bran in the first instance, and afterward increasing the quota by slow degrees. When a cow, or a herd of cows, has been fed regularly with turnips for months, the special turnipy flavor disappears entirely. To close observers, it has long been apparent that the first baiting of fresh spring grass (after the winter's feeding,) gave a rank taste to the milk; but this in a day or two will disappear entirely. In the same way the turnip diet, if entered upon suddenly, may give such strong flavor as to disgust purchasers; but if coyly commenced, with a nice regard to the hours of feeding, and adroit intermixture of bran, (and possibly a slight use of nitre, which, in the needed proportion, is no way harmful,) the change of quality is entirely unnoticed; and when once the cows are established upon their turnip diet, they may be fed through the season with the same, without the suspicion or the complaint of the consumers. In the feeding of carrots, there is of course no need of this exceptional watchfulness, and it is quite possible, (analysis would seem to prove it,) that they give an added richness to the milk. But carrots are grown at a far larger cost per bushel than turnips; they demand a longer season, deeper tillage—equally powerful fertilizers, and the cost of harvesting is, at the least, doubled.

All roots will keep well, pitted in the field—arranged in pyramidal heaps, covered with a foot of straw, and a foot of earth over the straw, with due regard to drainage; but in the cellar, carrots will maintain their good condition better than turnips, better than parsnips—better perhaps, than any root that is grown.

The washing of roots, for feeding, every day, is an expensive affair. I would advise no man to do it. The best means of avoidance is to dig the roots in sunny and dry weather—throw them in heaps—shaking them together as they are thrown, and giving them a new and final shake, as they go into the cart. If mud clings to them—as it will in muddy weather—the cost of preparation for the cows, will be nearly doubled. There is no possible or imaginable profit in feeding—mud. A cutter of some kind will of course be requisite—unless the roots are steamed to a pulp. Hovey's cutter I have found very effective, but believe that its working

is improved by removing the lesser transverse cutting bars, thus giving the turnips in slices.

If the milk-farmer does not harvest enough roots to provide a daily feeding through the winter months, he should by all means reserve a certain proportion of his crop for spring feeding. Roots will be specially serviceable in bridging the gap between the dried forage of winter, and the succulence of the first pasture. This is a change which is to be watchfully made, especially in the case of "springers;" hardly anything is more promotive of garget than the removal of a cow, within a week or two of her calving, from her winter's diet into luxuriant grass.

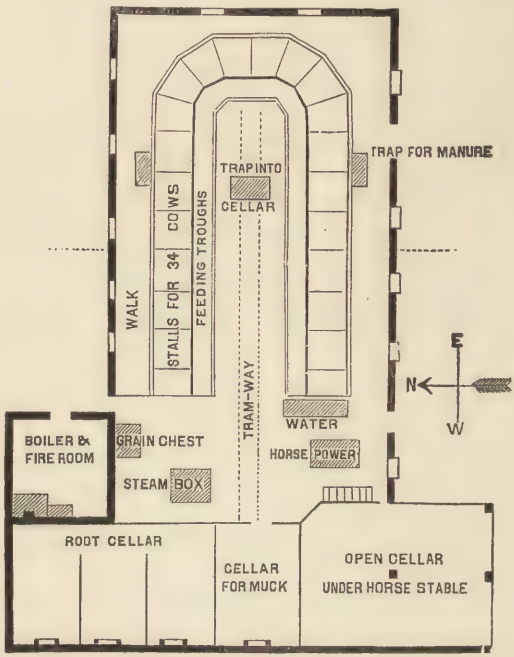


Fig. 2.—*Basement and Cellars of Milk Barn.*

Plan of Milk Barn.

I introduce here the plan of a barn—being in large part an adaptation of existing buildings—which I had purposed to erect some years since, but whose execution is still delayed. It is provided with all appliances necessary for the system of feeding thus far suggested—as well as for the summer feeding, of which I will speak presently.

The boiler and fire room, it will be observed, are entered only by an exterior door, and steam is conveyed to the cooking tank through the wall. A manure cellar is under the eastern half of the stable, extending from a point indicated by the dotted lines on either side. A tram-way is provided, leading down the centre of the stable, for the distribution of food, and for transport of muck from the cellar, partitioned from the root cellar for that purpose. The tram-way car should be furnished with a movable box for cooked food—another for muck, and a third and larger open frame for the

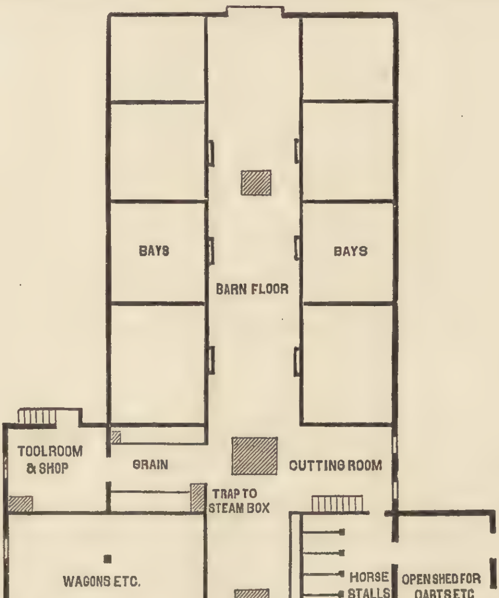


Fig. 3.—*Main Floor.*

reception of green fodder dropped through from the barn floor above. Water should pass in a trough—indicated by the two lines within the feeding boxes—completely around the stalls. This trough should be covered to exclude dirt, and provided with traps against every manger—which traps the cows will easily learn to lift with their noses. The gutter for liquid manure may be made to discharge at any desired point into the cellar below. "Stanchions," as fixtures for cows, are most economical of space; but I should prefer the ring and chain fastenings; these allow of

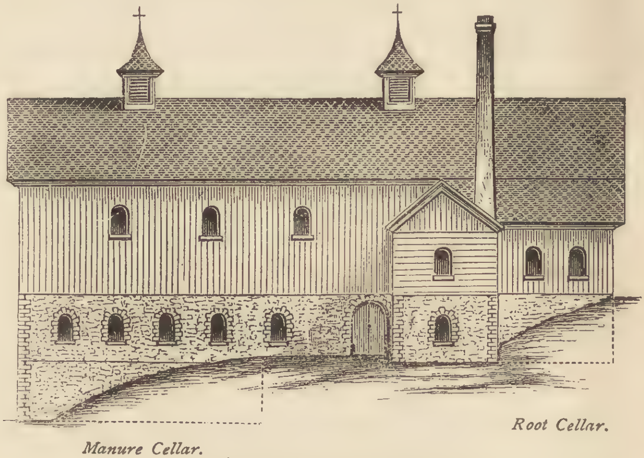


Fig. 4.—*North Elevation.*

an unobstructed view of the animal, from either front or rear, and show, I think, a little more of humanity in the herdsman.

The upper floor is simply arranged, and will explain itself, when examined in connection with the basement and the elevations.

The farther trap upon the floor is for the discharge of chaff, or muck—if desired—directly through the stable to the cellar below; on either side, under each bay, are indicated openings, through which hay when necessary can be dropped immediately into the feeding trough; the two farthest to the east, and the two westernmost, serve also as ventilators, being joined at the peak, for connection with the exterior ventilators shown above the roof.

An exterior communication with the work shop, above the boiler room, is not shown in this elevation, but indicated in the ground plan; it would be better, however, for the stairs to descend upon the north side.

The western front may be made much more effective architecturally if desired. I have consulted simplicity and economy only, in the plans. The space to the right of the horse stable, (marked "open shed" in the ground plan, and by error, represented with door in the elevation,) might if desired—by glazing its southern front—be converted into an admirable poultry house, communicating with the open cellar below; or the cellar itself, with its south-western frontage would serve well for such purpose, while a portion of the space above could be reserved for nests or roosts.

If a bull is kept—and unless a near one is available, such animal should be kept—quarters might be provided for him in the horse stable, or in the cellar under the southern wing. There is no provision for young

cattle, as none are supposed to be reared. Indeed, the plan has been arranged simply in view of the ordinary wants of a milk-farmer. I by no means present it as a model plan, but as one offering a great many con-

Fig. 5.—*Western Elevation.*

veniences—securing great economy of labor—great compactness and opportunity for full and free examination of all the animals.

Summer Feeding.

I come now to the subject of summer feeding. Of course nothing can be more favorable to a full flow of milk, than the juices of the early spring grass—upon which we can turn in this latitude, from the sixth to the tenth of May. As a preparative for this succulent diet, I would strongly urge an increase of the rations of carrots or of mangel wurzel, through all the latter part of April. With an abundance of May rains—and May rains are worth more than rains in any month of the year—the pasture maintains its luxuriance up to the middle of June. At this season, in our climate, there is apt to be a falling away in the succulence of the pasture food, and no recuperation possible for the cows, until they are turned upon the aftermath of the earliest mown meadows. If August be dry and scalding, there is another falling away, which, together with the heat, is apt to tell fearfully upon the milk product. But the milk-farmer has his customers to supply; he can do best, provided he can furnish milk, when the pastures are doing their worst. How shall he furnish himself with this unfailing supply? Possibly by quickening the lacteal secretions by doses of meal or bran, but in a far surer and more profitable way, by providing forage crops to be mown, and to be fed to his cows under the cool shelter of his stable.

This is soiling; and is the true method for every milk-farmer, whose nearness to a market will ensure him the ready disposal of his milk.—There may be wisdom in maintaining a certain range of pasture for the first feeding of his cows, (to be devoted to his horses or work cattle after

the heavy spring work is over.) But from mid-June to mid-October, I am satisfied that economy will eventually establish the system of *cutting* all the food for a herd of milch cows, where the product of the dairy must be maintained, as nearly as possible, at one unvarying level. In view of such a system, what forage plants shall be grown?

Crops for Soiling.

Winter rye is the first, in our climate, which will come to a sufficient height for cutting—we will say by the 20th of May. At first the cows eat it with avidity—particularly if wilted before it is placed before them; for this reason, it would be advisable to sow an acre or more of rye in later September—but not too much; so soon as the crop becomes rank, it grows distasteful to the cows, and the flow of milk falls off. The next cutting which can be depended upon, is clover, or—still better—Lucerne. I name this last with some hesitation, since some of the earlier growers of it have abandoned it as unsuited to the climate. Though very liable to be winter killed, I am able to affirm from my own experience, that it will give two, three or four cuttings in the season—that cows prefer it to any forage plant that can be set before them, and that no one tells so immediately and effectively upon the flow of milk. I hope that more extended experiments will be undertaken with it.

By the time the first crop of clover or Lucerne is past, the oats or spring-sown barley will furnish a week or two of good milk-producing food; and upon this, in ordinary seasons, will follow the April sowings of green corn. Nothing is more succulent, and scarcely anything can be more palatable to a dairy herd than this. The ground for this crop should be thoroughly enriched with the rankest of manures. Some prefer sowing the sweet corn, as furnishing more saccharine qualities in the stalk; possibly it may do so; but I have preferred, in my practice, to sow the long kerneled Maryland corn, as giving greater breadth of leaf, greater height, and a more rapid development.

Drilling (with Billings' corn-planter, which does the work very well,) is preferable to broad-cast sowing, for the reason that it admits of passing through it once at least with the cultivator. This much of tillage, in view of the condition of the ground when the crop comes off, will be good economy. The cutting may be commenced when the crop is thirty inches high, and should be finished by the time the spindles are fairly showing themselves. To this end, of course successive plantings will be required, which may be continued fortnightly up to the middle of July. There is great danger that corn fodder, sown after this day, will be clipped by an early frost. Until frost, however, actually comes, the corn forage may be safely counted upon; and after this date the tops of the mangel may be fed—to be succeeded by the tops of the carrots and of the ruta bagas. This latter, however, should be fed cautiously at the first; as they give an even stronger flavor to the milk if entered upon suddenly, than the roots. A little intermingling of carrots, and a sprinkling of meal—added

to a judicious use of the nitre at the start—will soon bring the flavor under control.

I do not think it worth while to enter into an argument here in favor of the soiling system; fortunately it is now a subject of very general discussion in the Agricultural papers, and the considerations in its flavor, and against it, have already been amply discussed.

The strongest argument against its adoption, is the increased labor demanded. The practical man is disposed to say—"I can drive my cows to gather their own food cheaper than I can keep horse and cart, and scytheman to procure it for them." But the practical man who bases his decision simply upon this consideration, overlooks the fact that by soiling, he saves the food which is inevitably trampled down by his herd, and that he effects a great economy of manure.

We come at all reforms by degrees, and it is far safest we should do so. There are hundreds of farmers now throughout the north, who insist upon foddering their cattle in the fields, and at the stack, through all the winter. They are perfectly aware that it involves a great waste of hay; they have fullest demonstration that their neighbors' cows, on the same amount of forage fed in the stalls, turn out in spring far more sleek, and in better condition every way; but (they allege) they avoid the expense of increased barn-room, and the other expense of carting out the winter's manure. In the end, these good people will be won over to the truth; and in the end, people who have cows to feed upon smooth lands, susceptible of easy tillage, will be won over to soiling. I have no more doubt of it than I have that ten is a larger number than eight, or that kindness will win more than severity.

The Milking and Cans.

A few other matters in relation to the subject of milk-farming, I must dispatch very briefly. The milking *should be done at regular hours*—no matter for rain, or haying, or any occasional pressure in the harvesting. It should not be done hurriedly or noisily; there should be deliberation, coolness, and quiet. If it be possible to secure female milkers—all the better, (provided always the importance of quietude be impressed upon them.) By as much as women are more gentle than men, by so much are they the better milkers. But it is too true that the race of milk-maids is going by; twenty years hence it is to be feared that they will live only in the traditions of the nursery books. That bouncing lass in Webster's Primary Spelling Book, who overset her pail as she forecast her gains, is now a stout woman in hoops, who—in place of a pail—carries a "snow flake" on her head, and reckons her gains by hundreds. Well; it is doubtless for the best; but let me advise the milk-farmer to choose his mild men for milkers, and to avoid (first,) the violent ones who will beat the cow with the stool; (second,) the lazy ones who will never strip a cow cleanly; (third,) the dirty ones who are uncleanly themselves; (fourth,) the harsh ones who will teach a cow to hold up her milk.

The milk may be strained into the cans directly, provided there are means of securing and maintaining a uniform temperature. The best way to do this, is to place them in a trough of flowing spring water, reaching to the neck of the cans, (the cans being left half open to give due ventilation.) If sufficient water be not available for this, a very good plan is to have coarse blanket jackets made for every can, and a small stream (a mere thread will do,) to trickle over them ; thus, constant evaporation and coolness will be secured. There are those who seize the bull by the horns, (metaphorically) by throwing a quart or two of iced water into the milk. I have nothing to say of this. It concerns only those who deal in milk and water. Yet another hint ; the milkman should be cleanly himself ; his waggon, his cans, his measures—all cleanly, and he should be capable of conciliating the house-maids.

A Dairy House.

The Conductors of The Annual Register have asked for a view of the Dairy-house at Edgewood Farm ; it appears at the opening of this paper—not altogether so like the original as I could wish—the chimneys not having their proper symmetry, nor the walls expressive of the peculiar and homely type of its building material. The portion of it which relates especially to the subject of this paper—to wit, the milk room—is at the eastern end of the basement, (the end view of the cut.) Its windows are sedulously guarded from the sun ; wire screens within exclude all insects ; a ventilating flue runs up from its ceiling in the kitchen chimney stack, and secures a constant flow of fresh air. A stream of fresh spring water, (from a faucet,) gives ample supply for cooling the milk, and the excess of its flow passes away through a grating in the cemented floor.

Fig. 6.—*Main Floor.*

The main floor, as given in the diagram (fig. 6,) shows only a fairly convenient arrangement of limited space. The only real merit of the design—if it have any—is in its tasteful adaptation of such homely material as is usually thrown by as intractable and unworthy of attention ; I allude to the ordinary cobble-stones

of the road-sides. In favor of the use of it here illustrated, I may say that the walls, which have now been standing, and exposed to all weathers for seven years, are as fair as on the day upon which they were laid. And if it should come into my plans to build a larger house upon the Edgewood Farm, I should endeavor still further to prove to the reluctant and infidel town builders, that Providence has not scattered these rough little boulders in vain, and that perseverance and skill will rear out of them homesteads in which economy and durability and beauty shall be joined together.

Edgewood, 28th July, 1866.

THE DUCK—Its Management and Varieties.

[Written for the Annual Register by C. N. Bement.]

IN REGARD TO THE ORIGIN of the common domestic Duck, but one leading opinion seems to have prevailed in all the compilations, from Aldrovandus down to Audubon,—that it is nothing more than the tame descendant of the wild Mallard,* an inhabitant of all the countries of Europe and North America. Audubon's problem, "when this species was first domesticated," has raised some doubts upon the subject, which it is of no use to suppress. One thing, however, is certain, the wild breed and the tame will freely intermix, and the progeny partake rather more decidedly of the habits and manners of the former than of the latter.

There are, indeed, many points irrespective of the varied colors in our domestic breeds, in which the tame and wild duck differ. For instance,

* A figure of which is given at the head of this article.

the tame duck is polygamous, but the wild species mates. Again, the feet of the wild duck are black, while those of the tame birds are flesh-colored or red.

"I know of no instance," says Mr. Dixon, "in which any one has finally succeeded in founding a permanent tame farm-race of Ducks, by breeding from the Mallard, though the attempts have been numberless, and a few parties have been on the very brink of success. Crosses between the wild and tame breeds have answered better ; but the progeny have retained their full share of independent temper and movements."

The Duck possesses many excellent qualities. They were great favorites with the ancients, from the mildness and simplicity of their character—from their fecundity, laying a great number of eggs—from the cheapness and ease with which they are provided for. Their manners and actions whether upon land or water, are curious and pleasant to contemplate. Their regular afternoon parade and march in line, the elder drakes and ducks in front, from the pond homewards, is a beautiful country spectacle, to be enjoyed by those who have a relish for the charms of simplicity.

No farm or country residence should be considered complete without ducks. A few should be kept on every farm for their services as grub-destroyers, for the beauty of their plumage, and for the pleasure of seeing them swim their minuets of the pond, bowing politely to each other—the bows to be returned before they take their afternoon's doze on the grass with sleepy eye-lids winking *from below*, and bills tucked under the feathers of their backs, by way of a respirator.

Comparative Cost and Produce.—Any calcuation as to the return to be expected by those who keep ducks, turns entirely on the locality. They are most likely to be kept with profit where access is allowed them to an adjoining marsh, or grassy brooks or ditches where they are able in a great measure to provide for themselves ; for, if wholly dependent on the owner for their living, they have such ravenous appetites they would soon, to use an emphatic phrase, "eat their heads off." No description of poultry in fact, will devour so much feed so greedily. But certain it is, that moderate limits are requisite for their excursions, for otherwise they would gradually learn to absent themselves altogether, and acquire semi-wild habits ; so that when required to be put up for feeding or immediate sale, they are then found wanting.

Range and Accommodations.—Ducks require water much more even than the goose ; they are no graziers, yet they are hearty feeders and excellent snappers-up of "unconsiderable trifles ;"—nothing seems to come amiss to them—green vegetables, especially when boiled, the offals of the kitchen, bread, corn-cake, meal of all sorts made into paste or gruel, grains of all sorts, animal substances, worms, slugs, crushed snails, insects and their larvæ, are all accepted with eagerness. Their appetite is not fastidious ; in fact, to parody an old song, "they eat all that is luscious, eat all that they can," and seem to be determined to reward their

owner by keeping themselves in first-rate condition if the chance of so doing is allowed them. They never need cramming—give them enough and they will cram themselves; yet they have their requirements and ways of their own which must be conceded. Confinement will not do for them; they thrive best and are cleanest in the neighborhood of water, such as grassy ditches, shallow ponds abounding in season with tad-poles and the larvæ of aquatic insects; they are also very fond of fish and clams and will devour them even when part decomposed. This of course will impart a bad flavor to their flesh if continued, but their feeding on young frogs will improve it—and why not? Do not the French make a delicious dish from the thighs or saddle of the frog, fried a-la-mode? These are the localities in which the duck delights, and in such are they kept at little expense.

Ducklings too early allowed their liberty on large pieces of water, are exposed to so many enemies both by land and water, that few reach maturity; and even if some are thus fortunate, they are ever after indisposed to return to the discipline of the poultry-yard. The best situation, therefore, is in a medium between such uncontrolled liberty and the close confinement of a poultry-yard.

As Layers. Incubators and Mothers.—Ducks are much more prolific than they have credit for, and even for eggs can be made a profitable bird if well-fed and well cared for. Any common duck so treated, if not old, will yield in a season one hundred or more large, rich, and delicious eggs. When they lay, it is daily or nightly, and if kept from sitting, (which is easily done by frequently removing their nests,) they will lay with little or no intermission, from March until August. But the trouble is, a duck lays when eggs are most abundant, while hens' eggs may be had at all seasons.

Ducks, if well-fed and warmly housed in a dry place in winter, will commence laying the latter part of March or first of April. They must then be closely looked after for they are very heedless, and drop their eggs wherever they happen to be—in the water or in shady and secluded places. And they hatch secretly, and some fine morning may be seen leading their young brood to the house to ask for food without requiring farther trouble. It is prudent, however, when the spring is at hand, to give them food three times a-day, but little at a time, and always in places where it is wished they should lay, and placing their nests where they once have laid. A strong desire for selecting her own nest is generally found to influence the duck; but is mainly the case as the time draws near for incubation.

The duck is a bad hatcher; she is too fond of the water, and is consequently too apt to suffer the eggs to get cold; she will also, no matter what sort of weather it be, bring the ducklings to the water the moment they leave the shell,—a practice always injurious and frequently fatal; hence the very common practice of putting ducks' eggs under hens for incubation. The eggs of ducks are thirty-one days in hatching; during

which they require no turning or other attention, and when hatched only require to be kept from the water one or two days; their first food may be boiled eggs and flour or middlings mixed. In a few days they will require no particular care, being perfectly able, with their mother's assistance to take care of themselves. But ducks at any age are the most helpless of the feathered tribe, having no weapons with which to defend themselves from vermin or birds of prey; and their awkward waddling gait precludes their seeking safety in flight. A good powerful game-cock, and a sharp little terrier dog are the best protectors of the poultry-yard. The old duck is not so brave in the defence of her young as the hen, but she will nevertheless, occasionally display much spirit.

The courage of the hen is eminently shown in her determination to resist any foe that may attack her nest or young; the duck on the other hand, though she vigorously repels any intruder while sitting, takes little trouble to protect her younglings. An instance of this indifference to the safety of a brood which were hatched close to the farm buildings: Several of the ducklings of the brood disappeared without the depredators being discovered, when we determined to watch and ascertain their fate. As evening drew on, a large rat was seen approaching, and with a view of seeing what defence might be made by the old bird, it was allowed to come up to her. A duckling was then taken by it from beneath the mother, without her ever moving or showing any sign of anxiety. Wishing to observe whether she would be more on her guard or equally passive, the rat was allowed to retire unmolested; and after a few moments the same or another animal of the same kind appeared as before, evidently intent on obtaining an additional victim. Still the duck remained without any expression of alarm, but our object being now gained, our gun numbered the aggressor among the slain.

THE DUCK HOUSE.—Where ducks are kept in considerable numbers, they should have a house of their own. The duck-house must be secure against prowling animals, such as foxes, skunks, weazels, rats, &c. The walls and roof should be low, and the latter thatched thickly with straw for warmth in winter, with the necessary openness for ventilation, and egress and ingress for the ducks. It need not be expensive. A piece of rustic work, which would cost but little, constructed some-

Fig. 2.—*Rustic Duck House.*

thing like fig. 2, would not only be useful but ornamental. It can be easily made by any person accustomed to the use of a saw and an axe; all that is required is a little taste, having the plan well digested before commencing, so as to require no alterations. After selecting the situation, join four pieces of saplings in an oblong shape for the sills; confine them at the ground, erect in the middle of the two ends a forked or crotched post of suitable height, in order to make the sides quite steep; join these with a ridge-pole; rough board it from the apex downward by the sills to the ground; then cover it with bark, roughly cut in pieces a foot square, laid on and confined in the same manner as ordinary shingles; fix the back end in the same way, and the front can be latticed with small poles, with the bark on, arranged diamond fashion, as shown in the sketch—a part to be made with hinges for a door.

The size of the building may vary according to the wants of the owner. Laying and sitting boxes may be placed at either or both sides of the building, under the roofing on the ground. Wood is seldom secure against rats, and does not so well suit the cleansing process of water and the lime-brush, and few places require their application more frequently.

Ducks should have a place separate from other fowls, on account of the great difference in their habits. The laying ducks should have plenty of room, for the sake of cleanliness, and should never share the habitations of geese, as the ducks are liable to persecution. When accustomed to be fed in the house they readily present themselves at the proper time—in the morning they get their feed apart from the geese and fowls—in which case they are not persecuted by the former, nor pilfered by the latter; and thus too, their eggs are secured with greater ease and certainty, since the birds are not released from their enclosure till after the hour which usually witnesses the deposit of their eggs. The floor of the duck-house should be paved with stone, brick or concrete, with considerable inclination, so that the wet when the floor is sluiced down may at once pass off.

Fig. 3.—*Coops for Ducks.*

Do not crowd your birds, and always arrange for ventilation. When

the flock is large, separate the young from the old, that they may thus have the advantage of better food, and that no risk may he incurred of finding the eggs of the old ones trodden down under foot and broken at your morning visit. On this account the laying ducks should always have plenty of room, and be kept by themselves.

Something like the preceding cut (fig. 3,) placed on an island or bank of a pond or lake, and half covered with vines or shrubbery, would make a very pretty home for ducks or other aquatic birds.

Rearing and Feeding the Young.—The best mode of rearing and feeding ducklings, says a writer, depends very much upon the situation in which they are hatched. The ducklings seldom require assistance in emerging from the shell, and this is fortunate, since it is a process of far greater risk to relieve than to render the same aid to chickens. The blood-vessels appear more liable to be ruptured and we have few instances where such precautions have proved successful. On hatching there is no necessity of taking away any of the brood, unless some accident should happen, and having hatched, let the duck retain her young upon the nest her own time. On her moving with her brood prepare a coop and pen (fig. 4,) upon the short grass, with a shallow vessel of water often to be removed. Their first food should be boiled eggs and flour, crumbs of bread moistened with milk—none the worse if a little sour. After a few days, corn-meal mixed with boiled potatoes, and and if a few cives, lettuce or cabbage leaves, chopped fine, be added, all the better. As soon as they have gained a little strength, a good deal of pot-herbs mixed with a little bran and ship-stuffs soaked in water, crushed oats, and boiled potatoes, beaten up together, are good for them. They are extremely fond of angle-worms, grubs, bugs of all kinds, for which reason it may be useful to have a run in the garden daily. All equally agree with young ducks, which devour the different substances they meet with, and show from their tender age, a voracity which they always retain.

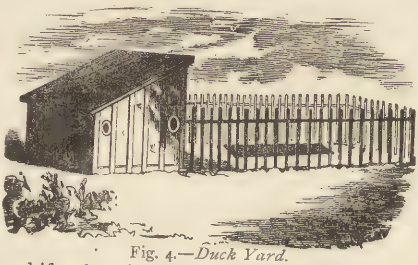


Fig. 4.—*Duck Yard.*

No persons are more successful in rearing ducks than cottagers, who keep them for the first period of their existence in pens two or three yards square, feeding them night and morning, with eggs and flour, till they are judged old enough to be turned with their mother to forage in the fields and ditches.

It is necessary, to prevent accidents, to take care that the ducklings come regularly home every evening; and precautions must be taken before they are permitted to mingle with the old ducks, lest the latter ill-

treat and kill them—though ducks are by no means so pugnacious and jealous of new-comers, as common fowls uniformly are.

One rule should invariably be followed, and that is, never to let the young ducklings out of their pens before half past 8 or 9 o'clock in the morning, since it is found that if by any chance a pen may have been let out earlier, the probability is that they soon suffer from cramp; and we are sure that this confinement is a great gain for any young bird—particularly young turkeys.

It is the general idea that the down about the tail on the young ducks should be cut close, especially if the weather be wet or drizzly. Nature certainly does not provide scissors for that purpose; and among our own broods which have undergone this operation, while others have been left unshorn for the sake of testing the effect, we have hitherto been unable to ascertain the difference in their subsequent progress. Wet weather, by a common though erroneous saying, is thought to be most favorable for ducklings, but though the dry weather and heat of mid-summer is unfavorable to their well-doing, the bright sunny days of spring are the times when they make most progress; and continued wet is at least as much against them as heat.

Ducks being aquatic in their habits, most persons suppose they ought to give the young ducks a great deal of water. The consequence is they often take cold, become droopy and die. This should be avoided. Ducks when first hatched, are always inclined to fever, from their pinion wing-feathers coming out so soon. This acts upon them as teething does on children. The young ducks should consequently be kept from everything that has a tendency to create cold in them. To prevent this, therefore, we always gave our ducklings as little water as possible. In fact they should only have enough to allay their thirst, and should on no account be permitted to play in the water.

If the owner lives near a city, liver and lights should be procured, and these should be boiled and chopped fine and given to the young ducks; or if fish, crabs and clams can be procured, these should be given them. If none of these can be obtained, all the victuals should be boiled before feeding. Half of the young ducks which are lost, die because raw food is given them. To sum up all in a word—if you wish to raise almost every one that is hatched, give them little water, and feed on no food which is not boiled. By observing this plan, we have raised for market and our own table, between two and three hundred ducks. Young ducks, however, seldom die with disease, and if cats and rats are exterminated, there will be no trouble in raising almost as many ducks as you have eggs. We have had from ninety eggs eighty-seven hatched, and raised eighty-three ducks, mostly Musk, or Muscovy, as they are sometimes called. Ducks come early to maturity, being nearly full grown and in fine eating order at four months, far exceeding in this respect all other poultry.

VARIETIES OF DUCKS.—Though little can be elicited as to the origin

of the Domestic Duck, we still possess birds in this class presenting features quite as distinct as any in the various races of fowls, and even to a greater extent than appear in geese. These varieties may be stated thus:

The Common Puddle Duck,	The Cayuga Duck,
The Rouen or Rhone Duck,	The Buenos Ayrean Duck,
The White Aylesbury Duck,	The French Call Duck,
The Musk Duck,	The English Marsh Duck.
The Crested Duck,	

Like those varieties of fowls that pass by the name of Everlasting layers —such as the Black Spanish, Polands, Fayals, Bolton Greys and Hamburgs—the production of eggs is the object to which the natural powers of the Rouen and Buenos Ayrean tend.

Of the wild varieties unreclaimed, we have the following:

The Mallard Duck,	The Canvasback Duck,
The Black Duck,	The Redheaded Duck,
The Wood Duck,	The Gadwell Duck.
The Pintail Duck,	

There are several varieties of domestic ducks, but their merits are more diverse in an ornamental, than in a profitable point of view, and will be estimated very much according to the taste of individual fanciers. Those who merely want a good supply for the table, cannot probably do better than just adopt the sort most common in their immediate neighborhood. But preference is generally given to the *Rouen*, of which the figures annexed (fig. 5,) are good representations.

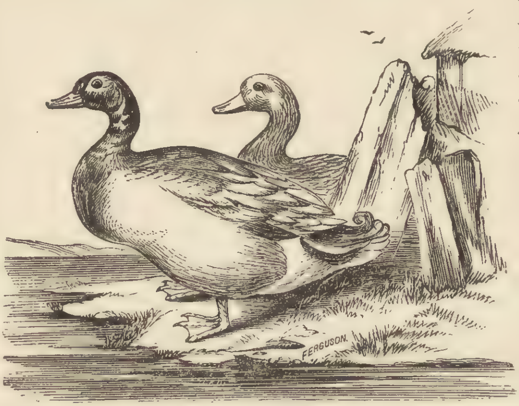


Fig. 5.—*Rouen Ducks.*

We have given preference to the Rouen, because we believe under ordinary circumstances, that it will be found the most profitable variety. Its plumage moreover, is of great beauty and richness. The latter we must admit is a point of minor consideration, in a bird whose merits must be mainly weighed by its value as an economical inhabitant in the poultry-yard; but where both these recommendations can be combined, there are few persons who would not be desirous of so uniting them.

"I am confident," says a celebrated breeder, "that when obtained

purely bred, the Rouen is the most prolific, the most profit producing of the duck tribe." They are the most lethargic, and consequently the most speedily fed of any, and they lay great numbers of large eggs, averaging three and a half ounces. The color of the egg is a blue green, the shell being consideraoly thicker than that of the Aylesbury breed. The flesh is of the highest possible flavor; and in first-rate specimens, the supply is most profuse; for a drake and three ducks belonging to the writer, weighed twenty-six and a half pounds, without any previous preparation. We have known the young drakes, of only nine or ten weeks old, to weigh when killed twelve pounds the pair; and in some instances more than this. As regards their consumption of food, we have found them to require no more than the birds of smaller varieties.

"In color, whether we consider the plumage of either sex," says a naturalist, "the Rouen closely assimilates to the wild duck. The eyes, however, are deeply sunk in the head, and the ducks especially, even when young, have the appearance of old birds; the abdominal pouch or apron being developed as is the case of the Toulouse goose, at a very early age." This enlargement of the lower part of the body in some specimens causes it to rest partly on the ground—not unfrequently, indeed to the destruction of the feathers. The whole appearance of the Rouen bird is certainly ungainly; but the most inconsiderate observer can hardly fail of being struck with the size of the really good specimens of this family.—Their dull loud call is also distinct from almost every other variety.

The Rouen duck has been usually spoken of as a late layer, but this is entirely contrary to what has happened with us, for we have found the old birds good egg-producers in autumn; in this respect they resemble the Brahma fowl—with some cessation in mid-winter, they commence laying sometimes at a period when others of their species have only just begun. Even the young ducks of the year are singularly prolific; those hatched in March will sometimes commence laying the latter part of August, or first part of September, and continue to give from three to four eggs per week till October.

It is indisputable that the most hardy variety of duck is the Rouen; and from this cause, it is that they are frequently kept with a degree of profit and success rarely attained where other kinds are preferred. The Rouen duck lays very freely if the eggs are removed, and the eggs are readily incubated by common hens; but for brood stock, ducks should only be used for rearing them, or in after time the drakes will be one of the most troublesome pests in the yard. Except for killing let the ducks themselves watch their own offspring—a duty they will accomplish with carefulness, perseverance and success.

The *Aylesbury Duck* (fig. 6,) with its snowy-white plumage, and its yellow legs and feet, is said to be best, and from its greater powers of locomotion, the bird is by no means given to such stay-at-home habits. It usually happens, as they advance in age, that the bills are stained with

dark spots. It is very common in the second or third year, and in the fourth the bill sometimes becomes perfectly black. So great a disfigurement of one of the principal characteristics of this breed, has been a subject of many inquiries; and from a variety of statements, we are led to believe that where the water accessible to them flows from a peat or moist soil, the evil in the generality of cases probably has its origin thus, though we are disposed to regard it as hereditary. The Aylesbury ducks are reputed very prolific layers; the eggs vary in color, some being white, while others are of a pale blue. They are assiduous mothers and nurses, especially after the experience of two or three seasons. Their flesh is of a beautiful white, and when properly fattened they are considered a rarity, and in consequence of their great size command the highest price—one-third more than other ducks carried to market.

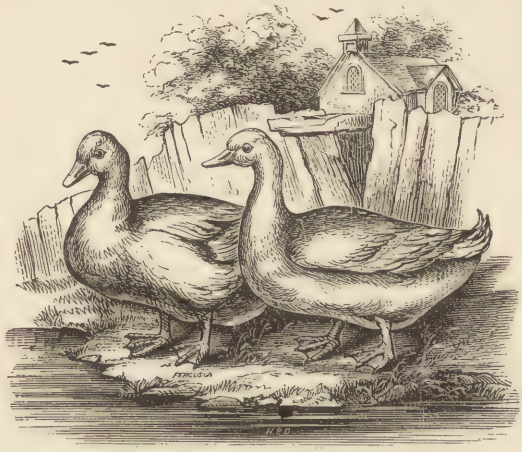


Fig 6.—*Aylesbury Ducks.*

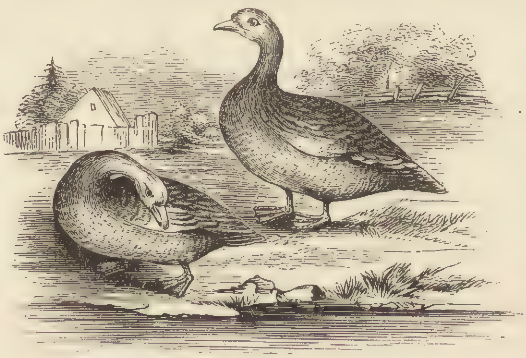


Fig. 7.—*Musk Ducks.*

As a further recommendation for them in an economical point of view, it is agreed that their consumption of food is less than that of the common puddle duck; and another advantage may be found in their comparative silence from the ever-

lasting "quack, quack," of the latter bird. They also attain greater weight in less time, and from their superior appearance when plucked, are a far more marketable article.

The *Musk Duck*, (fig. 7,) erroneously called Muscovy, is much larger than the common duck. They are of various colors from black to white, with a mixture of brown and drab. But black color would seem to belong to the bird in its wild state; and the best specimens of the tame birds are of similar plumage. The feathers of these are richly bronzed, and white patches generally appear on the wings after the first month—the colors of the legs and feet, with that of the plumage, being mottled in dull flesh color and black according to the tints of the latter. We have seen specimens marked white, with the solitary exception of a patch of dark gray on the back between the shoulders. Above the mandible rises a corrugated bunch of red flesh, and the skin of the face and that around the eyes which are full and dark, is also of the same color and bare of feathers. The crest of feathers elevated or depressed at pleasure, arises from the back of the neck. Their figure is of an extremely elongated character, and the shortness of their legs increases their stumpy appearance.

The duck has considerable powers of flight; but her mate's heavier bulk retards his aerial excursions. Contrary to the usual habits of this genus, a wall or the low branches of a tree are favorite resting places; and thus they are certainly less aquatic in their habits than the other species, though equally disposed to cultivate a familiar intercourse with man. The voice of the drake is so harsh and croaking, that he has been described as if perpetually suffering from a cold or sore throat; and contrary to the usual rule among their congeners, the female is comparatively silent. As layers they are inferior to the Rouen and Aylesbury, but probably on a par with the usual inhabitants of the duck-yard. The egg seldom exceeds three ounces in weight, and is of a dull white. The period of incubation is about five weeks.

We constantly hear of the Musk duck eggs proving unprolific, and the reason is sufficiently apparent, since in their wild state, the drakes are strictly monogamous, though admitting the companionship of several consorts in a state of domestication. We should, however, expect many more ducklings to be hatched from the eggs of a Musk duck with one or at most two ducks, than where a greater number were permitted to associate with him. We found one drake sufficient for four ducks. They are good breeders, the young tough and hardy, and the rearing of them is not attended with greater difficulty than that of the other domestic varieties.

The *Cayuga Black Duck* (fig. 8,) derives its name from the lake, on which it is supposed to have been first discovered. For the following interesting account and very spirited and truth-like portraits of the ducks figured in the following page, we are indebted to Mr. J. R. PAGE, of Sennett, Cayuga county, who is a successful breeder of them.

"Of the origin of the Cayuga Duck," says MR. PAGE, "I cannot give anything reliable. The duck has been bred in the county so long that all

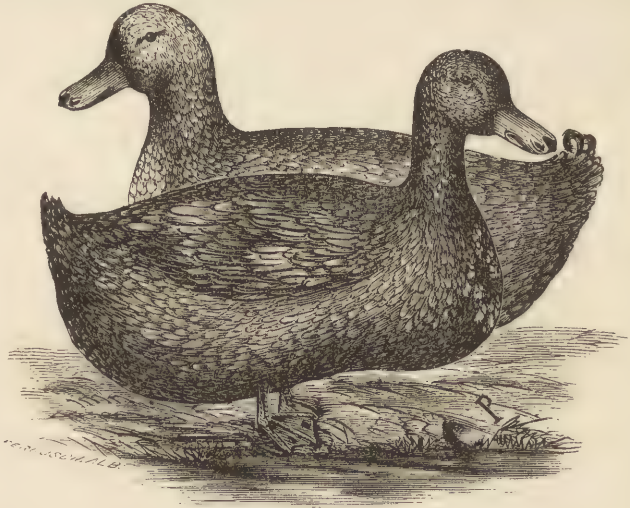


Fig. 8.—*Cayuga Duck*

trace of its origin, so far as I can learn, is lost. Tradition says they are descended from a sort of wild ducks that stop in Cayuga lake and Seneca river, on their passage north and south—fall and spring; yet from hunters I have never been able to obtain or hear of any birds closely resembling them, either in weight or feathers. Yet they are called the 'Big Black Duck,' 'Cayuga' or 'Lake Duck.' The first I ever heard of them was thirty years ago, that a farmer near Montezuma, on the Seneca river, had a flock of ducks bred from wild ducks he had caught, and that they were very large and fine. Another tradition is, that they are a stock brought from one of the Hudson river counties, (probably Duchess,) but the general belief is that they originated from the wild black duck.

"The Cayuga black duck in perfection, is black with a white collar on the neck, or white flecks on the neck and breast—rarely black without white, and as the white seems to increase, we usually select them nearly or quite black for breeding. The duck has a faint green tinge on the head, neck and wings. The drakes usually show more white markings than ducks, and the green on the head and neck, which is more strongly marked. They differ from the Buenos Ayrean ducks very materially, are much larger, longer in the body, and shorter in the legs, better breeders, but not so intense in color; indeed, beside the Buenos Ayrean (and I have them both,) the Cayuga look brown."

"The Cayuga Duck," says another writer, "is of great richness, much resembling the wild duck ; the drake, especially, is magnificent ; its head and neck being a rich lustrous green, with a white ring at the base of the neck and breast, and saddle of a bright reddish brown, the remainder of the body and wings partaking very much of the Mallard. When well-fed the duck begins to lay about the first of April, and usually gives an egg every day until she has laid 80 to 90 eggs, when she will generally lay a clutch in September. The Cayuga duck is hardy, of good size, and for the table is equal if not superior to all other ducks, or poultry of any sort ; flesh quite dark and high flavored. If well-fed they become very fat ; can readily be made so fat they can't step over a broomstick, and cannot raise themselves from the ground by their wings ; a foot wide board keeping them from my little trout-pond. My flock last year weighed—ducks one to three years old—seven to seven and a half pounds each. Drakes nine pounds, or seventeen pounds the pair ; yet these are extreme weights and only reached by careful feeding, and in very small flocks—twelve to fourteen pounds the pair would be a good average in large flocks. I once had a flock that averaged at 6 months old sixteen pounds the pair, but they had been forced to their utmost, and never gained weight after 6 months."

Another writer says, "the Cayuga duck is very quiet in its habits ; can't fly, rarely able to rise from the ground ; a fence one foot high will turn them ; not disposed to wander from home ; commence laying about the last of March, 50 to 90 eggs, on which to sit, if everything is convenient ; sit well, careless mothers ; cross readily with other ducks and produce certain."

"One of my ducks," continues MR. PAGE, "showed a disposition to sit early this year ; sat on 14 eggs ; hatched 13 young, and bids fair to raise all of them, as they are now (July,) several weeks old, yet the duck and the young ones are more often apart than together."

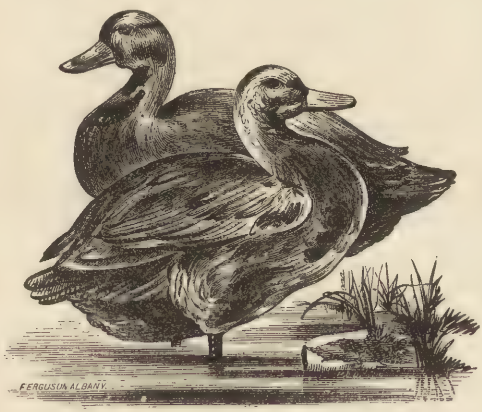


Fig. 9.—*Buenos Ayrean Duck.*

The *Buenos Ayrean Duck*, (fig. 9,) which is annexed is not often met with in this country, but deserves to be better known. It is called by some Brazilian better known in England as the East Indian Duck. Mexican and Maroon are other aliases, by which they have passed

These, however, require less notice than those that have already been mentioned. They are of less size and lighter than the Rouen and Cayuga breeds, the adult male rarely exceeding five pounds in live weight, while the female averages but four pounds. Their plumage, however, is strikingly beautiful. Their plumage possesses the peculiarity unusual in birds of this genus, that the drake does not monopolize all its glories, a portion of his refulgence being granted to the duck. Metalic tints, varying with the light from green to a gilded purple, decorate their garb of uniform black, their bills and feet being of the same dark hue. Not only the neck and back, but the larger feathers of the tail and wings, are gilt with metalic lustre and a gleaming of blue steel about its breast and wings. With all their brilliant combinations of color there is a singularly neat make and compactness of feathers, which suggest their comparison in some respects, to the game fowl.

They commence to lay early in March, and produce one egg a day each till late in May. The first eggs laid in the beginning of the season, are frequently smeared with a dark greasy matter, and appear of a slaty, and sometimes even of a dark hue. The coloring matter does not penetrate the shell, but may be scraped off like the similar coating on the bones of the white Silk fowl. When six or eight eggs have been deposited, they gradually fade away to a dull white. In form they are elongated, being smooth, thin-shelled, and weighing about two ounces. The ducklings are somewhat difficult to rear, being very subject to cramp. This will not surprise us when we remember the warm temperature of their eastern abode.

The drakes are unusually pugnacious, and many speak of the impossibility on this account of keeping two of them in the same enclosure. We have one drake on a sheet of water that not only keep other drakes from the water, but will even drive geese from their premises. They are less disposed to confinement than domestic ducks; being light on the wing, they often make aerial excursions in the neighborhood, but invariably return to their old quarters, on which account, when removed to a strange place they should be either pinioned or have one wing clipped, until they get wonted to their new home.

The most suitable locality for these ducks is found for them on a piece of ornamental water, where, in addition to the beauty of their appearance, they add the farther recommendation of the highest quality for the table. For this latter purpose they require no fattening, and but few wild ducks are more tender and of higher flavor. But we think one would as soon take a Chinese teal for luncheon, or a goldfish for breakfast, as to consign the handsome Buenos Ayrean to the spit.

The *Canvasback Duck*, (fig. 10,) so far as can be judged from the best figures and descriptions of foreign birds, is altogether unknown in Europe. It probably received its name from the peculiar color of the feathers on the back, which very much resemble coarse canvas. It approaches near

to the Pochard of England, (Anas Ferina,) but differs from that bird in being superior in size and weight, in the greater magnitude of the bill and the general whiteness of its plumage. The Pochard, according to Latham, measures 19 inches in length and 30 in extent, and weighs one and three-quarter lbs. The Canvasback measures 2 feet in length, and 3 feet in extent, and when in the best condition weighs 3 pounds and upwards.

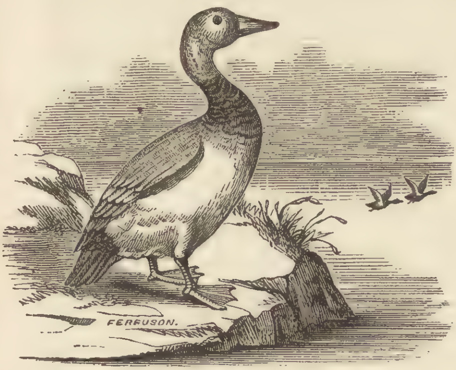


Fig. 10.—*Canvasback Duck.*

Bewick says of the Pochard: "The plumage above and below is wholly covered with prettily freckled, slender, dusky threads, disposed transversely in close zig-zag lines, on a pale ground, more or less shaded off with ash:" a description much more applicable to the Redhead, and which is very probably the species meant. In the Pochard, given by Bewick, who is generally correct, the bill agrees very well with that of our Redhead, but is scarcely the size and thickness of that of the Canvasback.

The Canvasback, in the peculiarly rich, juicy tenderness of its flesh, and its delicacy and flavor, stands unrivalled by the whole of its tribe, in this or perhaps in any other quarter of the world. Those killed in the waters of the Chesapeake are generally esteemed superior to all others, doubtless from the great abundance of their favorite food, which is there produced. It is well ascertained that they feed on a tuberous root, or a grass which grows on the flats, and has very much the color and flavor of garden celery; it is to this food that has been attributed, and we believe correctly, the peculiar delicious flavor of their flesh. This plant, which is said to be a species of *Vallisneria*, grows on fresh water shoals, is from 7 to 9 feet long, and having narrow, grass-like blades of 4 to 5 feet; and with great strength and agility, the Canvasbacks seize the grass near the bottom, bringing it up root and branch, to the surface, where they bite off the root, leaving the long herbaceous plant to float on the water.

We have been informed that attempts have been made to domesticate the Canvasback duck, but have not learned with what success. We saw a few years ago, in the yard of a gentleman near Baltimore, a hybrid, a cross between the Canvasback and common duck. It was timid, shy, and seemed to retain many of the wild habits, and did not seem to associate with the other ducks in the yard.

At our public dinners, hotels, and particular entertainments, the Canvasbacks are universal favorites. They not only grace, but dignify the table, and their very name conveys to the imagination of the eager epicure, the most pleasing and exhilarating ideas. Hence it is not uncommon to pay from one to three, and even five dollars a pair for these ducks; and indeed, at such times if they can, they must be had, whatever may be the price.

"The *Redheaded Duck,*" (fig. 11,) says Wilson, "is a common associate of the Canvasback, frequenting the same places and feeding on the stems of the same grass, the latter eating on the roots; its flesh is very little inferior, and it is often sold in our markets for the Canvasback, to those unacquainted with the characteristic marks of each. Anxious as I am, to determine precisely whether this species be the Redheaded Wigeon, Pochard or Dun-bird of England, I have not been able to ascertain the point to my own satisfaction; though I think it very probably the same, the size, extent, and general description of the Pochard, agreeing pretty nearly with this.

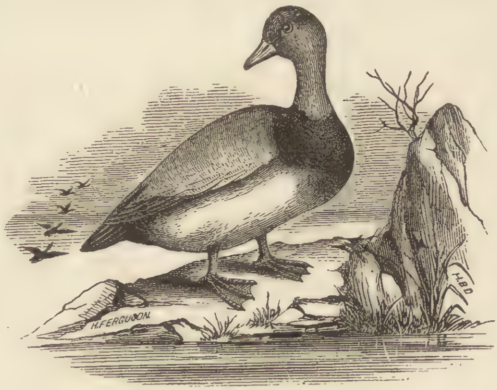


Fig. 11.—*Redheaded Duck.*

"The Redhead is 20 inches in length, and 2 feet 6 inches in extent; bill dark slate, sometimes black, two inches long, and seven-eighths of an inch thick at the base, furnished with a large nail at the extremity; irides flame-colored; plumage of the head, long, velvety and inflated, running high above the base of the bill; head and about two inches of the neck, deep, glossy, reddish chestnut; rest of the neck and upper part of the breast black, spreading round to the back; belly white, becoming dusky toward the vent by closely marked undulating lines of black; back and scapulars bluish-white, rendered grey by numerous transverse waving lines of black; lesser wing coverts brownish-black, wing quills very pale slate, dusky at the tips; lower part of the back and sides under the wings, brownish black, crossed with regular zig-zag lines of whitish; vent, rump, tail and tail coverts, black; legs and feet dark ash.

"The female has the upper part of the head dusky-brown, rest of the head and part of the neck a light sooty-brown; upper part of the breast

ashy-brown, broadly skirted with whitish; back dark ash with little or no appearance of white penciling; wings, bill and feet nearly alike in both sexes."

This duck is sometimes met with in the rivers of North and South Carolina, and also in New Jersey and New York; but always in fresh water, and usually at no great distance from the sea.

The *French Call Duck*, (fig. 12.)—Of these there are two distinct varieties, the one is white the other colored. In form and habits they are identical, and therefore, when we have described the one as being of clean white plumage, with a bright yellow bill and yellowish red legs, we may at once pass on to the brilliant colors of the other, and their joint peculiarities.

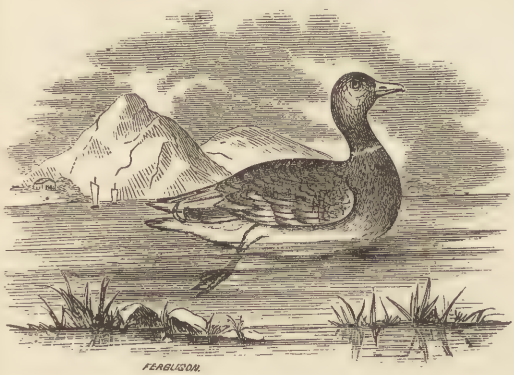


Fig. 12.—*French Call Duck.*

We at once notice in these birds, the possession of many points of difference between them and any of the domesticated ducks; nor is any closer connexion visible to us, when the wild duck itself is brought into comparison with this diminutive breed. Voice, plumage, habits, and general character, all concur to distinguish it from the others.

A naturalist says, "with respect to the Call Duck, I may premise that I have never met with a trivial name for it. It is not considered as a species, nor is it referred to as a variety, in any of the works on European ornithology. It is truly French, and best known by the name of French Call Duck. We have them in St. James' Park, and from their habits, &c., from the circled feathers in the tail of the drake, I have always considered them as varieties only of *Anas Bochas*, like the Aylesbury Ducks, but not nearly so good a bird. It breeds readily with the Aylesbury or Bochas. This duck has earned its name by being very noisy; this perpetual clatter rendering it of great service in working decoys. Regarding this qualification, it is said that a French duck, like a Frenchman, makes twice as much noise as an English one.

The Call Ducks possess considerable powers of flight, which they make active use of during the period preceding their breeding season, which generally commences in February or beginning of March. The egg is long,

smooth, of a dull white, and weighs one and a half ounces—the period of incubation as with other ducks. The flesh is dry and without flavor, being thus in marked contrast to that of the wild duck.

From the many points in which the habits and character of the Call Duck are seen to vary from the different domesticated ducks, common opinion is apt to assign their origin to an immediate descent from the wild bird. This idea is often encouraged by the repeated instances of what are called "White Wild Ducks" being shot; but these, on inquiry, have turned out to be merely White Call Ducks; many of them being marked on the web of the foot by former owners.

The voice of the Call Duck is clear and continuous, and is a much higher note than that of the other breeds; but this note is mainly limited to the females; for the male birds are comparatively silent, and their cry is a low whistle, very unlike the clamorous quack of their consorts. Some of these birds were imported to New-York in the winter of 1866, under the name of "*Singing Ducks.*"

The *Gadwell Duck* (fig. 13,) is found along the whole of our Atlantic coast, from Maine to Texas. From the following note of Dr. Bachman, addressed to Mr. Audubon, we may judge how easily this fine species might be domesticated. "In the year of 1812," says the Doctor, "I saw in Duchess county, in the State of New-York, at the house of a miller, a fine flock of ducks to the number at least of thirty, which from their peculiar character and appearance struck me as different from any I had before seen among the different varieties of the tame duck. On enquiring, I was informed that three years before, a pair of these ducks had been captured in the mill-pond. They were kept in the poultry-yard, and it was said were easily tamed. One joint of the wing was taken off to prevent their flying away. In the following spring they were suffered to go into the pond, and they returned daily to the house to be fed. They built their nests on the edge of the pond and reared large broods. The family of the miller used them occasionally as food, and considered them equal in flavor to the common duck and more easily raised. The old males were more beautiful than any I have examined since; and as yet domestication had produced no variety in their plumage."

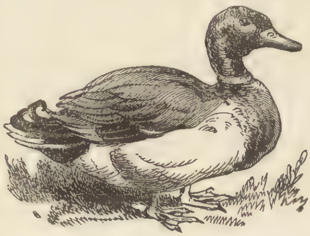


Fig. 13.—*Gadwell Duck.*

We should like to ascertain whether any of this stock, to which Dr. Bachman refers, are still in existence, and whether any serious efforts have been made in any part of this country to domesticate any other species of the feathered tribe; the number thus far reduced to perfect domestication is exceedingly small, and every new species thus rendered subservient to the use of man, must be a valuable acquisition.

The *Wood Duck*, (fig. 14,) is considered one of the most beautiful ducks known ; the only one approaching it being the Mandarin Duck of China, which indeed it strongly resembles. Its popular name of wood duck is derived from the fact that it makes its nest in the hollow of trees ; and the *summer duck*, from remaining with us during the summer months, and migrating southwardly with the cold weather. It is familiarly known in every part of the United States, from Florida to Lake Ontario. It rarely visits the sea shore or salt marshes, its favorite haunts being the solitary, deep and muddy creeks, ponds and mill-dams of the interior, making its nest frequently in some old hollow tree that overhangs the water.

Fig. 14.—*Wood Duck.*

The Wood Duck is equally well known in Mexico and many of the West Indian Islands. During the whole of our winters they are occasionally seen in the states south of the Potomac. On the 10th of January, Doughty says he met with two on a creek near Petersburgh, Virginia. In the more northern districts, however, they are migratory. In Pennsylvania, the female begins to lay late in April, or early in May. Instances have been known where the nest was constructed of a few sticks laid in a fork of the branches ; usually, however, in the hollow of a tree, which is selected for this purpose.

The Wood Duck seldom flies in flocks of more than three or four individuals together, and most commonly in pairs or singly. The common note of the drake is *peet*, *peet*, but when standing sentinel if he sees danger, he makes a noise not unlike the crowing of a young cock—*Oe-eek, oe-eek!* It breeds from Mexico to the Columbia river, and eastwardly to Nova Scotia. It has been found from 19° south to 54° north latitude. Its food consists of acorns, chestnuts, seeds of wild oats, aquatic plants and water insects. Its eggs yellowish-white. Their flesh is inferior to that of the Blue-winged Teal.

Among other gaudy feathers with which the Indians ornament the calumet or pipe of peace, the skin of the head and neck of the wood duck is frequently seen covering the stem.

This beautiful duck is easily domesticated and soon becomes so familiar as to permit one to stroke its back with the hand. They are tamed in various parts of the union. "Captain Boice, collector of the port of Havre de Graec, informed me," says Wilson, "that about forty years ago, a

Mr. Nickols, who lived on the west side of Gunpowder Creek, had a whole yard swimming with Wood ducks which had been tamed and completely domesticated, so that they bred and were as familiar as any other tame fowls; that he himself, (Capt. Boice,) saw them in that state, but does not know what became of them." Latham says that they are often kept in European aviaries, and will breed there.

Description.—The Wood duck is from 19 to 20 inches in extent; bill red, strongly toothed, much hooked, shorter than the head, the feathers in front descending low, margined with black; head deep glossy green; iridis orange red; point, crown and pendant crest rich glossy green, ending in violet elegantly marked with a pure white, running from the upper mandible over the eye, and with another band of white proceeding behind the eye, both mingling their long pendant plumes with the green and violet ones, producing a rich effect; cheeks and sides of the upper neck violet; chin, throat, and collar round the neck, pure white, curving up in the form of a crescent nearly to the posterior part of the eye; breast dark violet-brown, marked on the fore part with minute triangular spots of white, increasing in size until they spread into the white of the belly; each side of the breast is bounded by a large crescent of white, and that again by a broader one of deep black; sides under the wings thickly and beautifully marked with fine undulating parallel lines of black, on a ground of yellowish-drab; the flanks are ornamented with broad alternate semi-circular bands of black and white; sides of the vent rich light-violet; tail coverts long, of a hair-like texture at the sides, over which they descend, and of a deep black glossed with green, back dusky-brown, reflecting green above, below dusky; primaries dusky, silvery-hoary without, tipped with violet-blue; secondaries greenish-blue, tipped with white; wing-coverts violet-blue tipped with black; vent dusky; legs and feet yellowish red; claws strong and hooked.

The female has the head slightly crested, crown dark-purple behind, the eye a bar of white; chin and throat, for two inches, also white; head and neck dark drab; breast dusky-brown marked with triangular spots of white; back dark bronze-brown, with some gold and greenish reflections; speculem of the wings nearly the same as in the males, but the finepencilling of the sides, and the long hair-like tail coverts are wanting; the tail also is shorter.—*Wilson.*

Fig. 15.—*Mandarin Duck.*

A remarkably beautiful addition to our ornamental water-fowl, is the *Mandarin Duck*, (fig. 15,) a Chinese variety. In many respects it resembles our American Wood

duck, which is one of the most beautiful of the family of ducks, but is said to be surpassed by the Mandarin species, which is even more beautiful and gorgeous in its plumage. Of its habits we are not advised. The specimens from which the preceding portrait was taken, were bred in the Zoological Society's Gardens, in the Regent's Park, London, and were originally brought from Whampon, China.

The Mandarin drake is represented as being the most gorgeous in plumage of all water-fowl, (our beautiful Wood duck should be excepted.) The top of the head is black, a color which extends down the nape of the neck; below is a clear white line passing over the eye down the base of the bill, which is of a bright rose-color. The cheeks and the long pointed feathers of the neck, are of a bright orange-brown. The upper parts of the breast and back are of a glossy black, and the lower, white. The two raised feathers of the wings are orange-brown; the flight feathers are white and black. The tail is black, except underneath, which is white. The sides of the breast are greenish-orange, margined by a clean white line. The legs are a deep pink. From the middle of June, to the middle of September, the drake assumes the color of the duck, which is a dull olive-brown. He, like the Buenos Ayrean, is very pugnacious, and quite a tyrant over other aquatic birds.

MANURING AND CULTIVATING FRUIT TREES.

THE DIFFERENCE between quackery and regular treatment is, the former applies remedies indiscriminately, while the latter administers according to certain and specific wants. When the farmer breaks his wagon, the quack would proceed by driving nails here and there all over it, hoping accidentally somewhere to reach the fracture. The regular repairer first ascertains where the difficulty lies, and then proceeds at once to correct it.

It is somewhat thus in the cultivation of fruit trees, particularly with those sorts like the dwarf pear, which will not flourish under neglect. We often see directions on the precise amount of manure which should be applied to the dwarf orchard—some demanding even as much as an annual coating of three or four inches around the tree to be worked into the soil, while others succeed with a very moderate application. Others, again, find, as they suppose, that manure is entirely unnecessary or detrimental. One man appears to succeed as well with his apple orchard kept in grass closely grazed by sheep or swine, with only the top-dressing which these animals give, as another does with constant and mellow cultivation. These differences of treatment must depend much upon the character and natural fertility of the soil; and to give precise directions that are required to be followed out in all cases, would be like issuing general instructions, stating how many strokes of the whip must be given to a horse in order

to get a day's labor out of him, without reference to his character for spirit or stupidity; or like the orders of a railway manager to apply the brakes every fifteen minutes, without regard to an upward or a descending grade.

We often receive inquiries as to the amount of manure to be applied to trees. The answer must be, Act according to circumstances. The question again recurs, How shall we know what our soils need? The answer is, Observe the results of growth. An examination or analysis of the soil will be of little use. But the trees will tell their own story. If the soil is so rich that the trees make annual shoots of two or three feet or more in length, without any cultivation or manuring at all, (which, however, is hardly a supposable case,) then it will be needless to give additional care. *The annual growth is the best guide to treatment.* There are very few apple or other orchards which, after reaching a good bearing state, throw out annual shoots more than a foot or a foot and a half long, and many not half this length. The owner may lay it down as an unalterable rule that when his trees do not grow one foot annually, they need more manuring or cultivation, or both. By observing the growth he can answer all questions of the kind referred to without difficulty.

Perhaps it may be useful to remark on the different means or degrees for increasing the vigor of trees: 1. The weakest or most inefficient means is digging small circles with the spade around the foot of the stem, either with or without the addition of manure; because the roots of a tree being at least equal each way to its height, reach out on all sides far beyond these circles; and often not a fiftieth part of them are affected. 2. Better than the last named mode, is keeping the grass grazed short by swine or sheep—protecting the stems from injury with boxes or thorny brush—giving annually in autumn a thin top-dressing of manure. 3. Where this treatment does not impart sufficient vigor, then the third remedy must be resorted to, viz: keeping the whole surface in a clean, mellow condition. If the soil is rich enough, it will do to raise beans or root crops, or even Indian corn—otherwise it should be left perfectly clean, and manure added annually if necessary. Thick dressings of manure applied in autumn and spaded under in spring, are only required for dwarf pears which have become much stunted, in connection with free pruning, until shoots at least two or three feet are obtained. Meadow or sowed grain should never be allowed in any orchard whatever.

"Why Don't the Butter Come?"—It is difficult to manage cream in cold weather, so as not to have the churning occupy an unreasonable length of time, to the injury of the quality of the butter. Hiram Olmstead, of Delaware Co., says "that the following are some of the causes that delay the butter from coming. The milk has been kept too cold, which prevented the cream from souring. Sour and sweet cream may have been mixed. The cream from farrow cows may have been mixed with cream from those that are not farrow. The cream may not have been sufficiently warmed, and the cows may have lacked salt while fed on dry food. The milk may have stood too long before it began to change. These should all be guarded against."

THE RUTA BAGA CROP.

THE SKILLFUL FARMER RELIES for success on more than one branch of husbandry. Or, to use a familiar comparison, he is not satisfied with but one or two legs to his stool. The cultivator of grain alone, or the exclusive raiser of cattle, does not succeed so well as he who combines both on the same farm. Heavy crops require copious manuring, and animals are necessary for the manufacture of manure. The more enriched the land, the more enlarged the herd it will sustain; and the larger and better the herd, the greater the increase of enriching material.

The turnip crop is valuable on more than one account. It gives the land owner a large amount of feeding material from a limited area, and is well adapted to farms in high condition. It, therefore, compels a more perfect system of culture; for while a bushel of turnips may be raised for five cents on a rich soil with good management, the cost will be ten or twenty times as much on poor, neglected, and weedy ground. A mixture of turnips with dry fodder in winter, is not only economical in itself, but tends largely to promote the health of domestic animals. A suitable portion of these roots, sliced by a machine and mixed with meal and chopped straw, has kept a herd of cattle in finer condition through winter, than a liberal supply of the best hay, fed alone.

Soil and Rotation.—The best soil for the Ruta Baga, is *one which may be finely pulverized*, combined with high fertility. It is a common opinion, that a light or sandy soil is best—which is true when it is compared with a heavy or wet clay, which forms numerous clods. But a strong loam, perfectly underdrained, and kept mellow, like an ash-heap, by working frequently when dry enough, will retain manure better, and therefore yield heavier crops. Turnips may occupy the same field with corn and potatoes, provided the ground may be thoroughly subjected to previous cultivation to destroy weeds. The stubble of wheat or other grain, is often selected for this purpose; and the crop may be followed by barley, which does best on this rich prepared soil, or by oats. The land may be seeded down with the barley, or with another wheat crop the succeeding year. Nothing gives a better opportunity for cleaning the land of foul stuff than the Ruta Baga; and this opportunity becomes absolute necessity if a cheap and remunerating product is expected. This thorough cultivation, in connection with the manuring required, prepares the land for any succeeding crop that does best on well prepared land.

Preparation of the Soil.—Many persons not accustomed to raising roots, have signally failed because they have selected a foul or weedy field. The labor of cultivation, much of it necessary by hand, has been increased ten-fold. The young plants, instead of having free access to light and air, and a fresh, unoccupied soil, have been over-grown by weeds, which have pumped out the moisture and sucked the fertility from

the earth, crowded the young plants into small feeble stems, and shut out light for their development above. The negligent cultivator, who allows his young crop to become over-topped by a mass of green weeds half a foot high or more will probably have to pay fifty cents or a dollar in labor, for every bushel of roots he obtains, instead of six or eight cents only, from a well prepared and well managed piece of ground.

The first great object then, is to get rid of the weeds beforehand in the wholesale manner of plowing and harrowing, with nothing to impede this broadcast labor. Take, as an example, a piece of wheat stubble. There are often many small weeds scattered over the surface, which have either dropped their seeds, or will be likely to do so, if left undisturbed. Give the whole ground a thorough harrowing. This will destroy the young weeds and bury the seeds, so that they will sprout after the first rain.—When they have grown so as to form a green coating a few inches high, turn them all under, by a shallow plowing. If other weeds spring up these may be harrowed and plowed under in turn. In this way, the seed may be entirely eradicated at a very small expense, compared with that of picking them from the plants the following season by hand. Let us make an estimate of the cost of these two modes. We will give an acre of land three plowings and ten harrowings, costing altogether about six dollars, and giving a surface as clean as a floor the following year. But one thinning and hoeing will then be required, which a good hand will easily accomplish in three days, costing, say five dollars more, and making eleven dollars for the whole task of eradicating weeds and thinning. In opposition to this, take the following estimate of the cost of working an acre of foul land:

Hand-weeding 4 miles of drills, or over 20,000 feet in length.......	$30.00
Second weeding by the hoe,..	6.00
Extra labor, horse-cultivating,....	3.00
Crop diminished one-half, or 400 bushels lost, at 10c,....	40.00
	$79.00
Deduct labor on clean acre,....	11.00
Dead loss on foul ground,....	$68.00

This loss will of course vary with the amount of foul seed in the land.

MANURING.—No crop makes a better return for good manuring than Ruta Bagas; and nothing is more unprofitable than attempting to raise them on poor ground. The English practice is to manure them exclusively in the drill. This is very important, in giving the young plants an early start, that they may escape the turnip fly. But unless the land is quite rich already, it should have an additional broadcast manuring. If old manure can be obtained in autumn, and applied and worked thoroughly into the soil, by the process already described for exterminating the weeds, it will serve an excellent purpose. If this cannot be done, a coating of old or fresh manure, spread just before winter and left on the surface to leach into the soil, will become thus well diffused, and the strawy or fibrous matter left in spring, may be raked or harrowed off or turned

under. If the manure cannot be applied till spring, it should be thoroughly mixed with the soil, by the plowing and repeated harrowing, which is required in any case to reduce the soil to a mellow condition previous to planting. The manure, for this reason, should be either fermented, or short and free from fibrous matter if fresh.

Manuring in the Drills.—Manuring in the furrows or drills gives the plants an early start, as already observed, and places them quickly beyond the reach of insects. The manure used for this purpose should be finely broken old manure, or compost, especially on light soils. Coarse manure on such soils, being left in lumps or unmixed with the earth, may increase the effects of drouth in dry summers. But for heavy soils, fresh manure, (not *wet straw* merely) may be highly useful, if pulverized and mixed by dragging a small log along a furrow before it is covered. This log (fig. 1,) should be somewhat pointed at each end, or cigar-shaped as shown in the accompanying figure, and a single one may be drawn along the furrow by one horse; or three attached to a cross-bar on a light sled, and drawn by two horses; from six to eight inches in diameter is large enough.

Fig. 1.—*Drag-log, for Grinding Manure in Drills.*

Where several acres are to be planted, it will save much time to the workmen, by adopting a regular system for the work. The furrowing, manuring and covering the manure in the drills, should go on, uninterruptedly together. It is a common practice, to manure five furrows at a time, for one passing of the cart or wagon. Five furrows should, therefore, be first made by the plowman; and one or two teams, according to the distance of the manure, used to distribute it, while the plowman is preparing another set. A single furrow will answer for each drill, if made by a good plow and a strong team, on clean, smooth, well-mellowed ground. If the soil is not well pulverised, or is cloddy, passing the plow twice in the furrow will be necessary. The following course may be pursued in either case—the drills being about twenty-seven inches apart, which will allow the wheels of the manure wagon or cart, to run smoothly in two furrows, without defacing the surface:—Measure off a strip of land on the side of the field furthest from the manure heap, wide enough to form ten drills, which will be about twenty-three feet. Set a row of light sticks near the middle of this strip, by which to strike the first furrow. When this furrow is plowed, the horses are turned to the left, so as to plow another furrow on the "land-side" of the first, twenty-seven inches from center to center, leaving an unplowed ridge between them, about a foot wide. The team continues to turn to the left at each end, plowing two furrows at each "round," each twenty-seven inches from the former. By the time the plowman reaches the edges of the field, he will have laid open ten furrows or drills, five of which nearest the boundary are taken for filling

with manure. The cart or wagon is driven along, and the manure shoveled from it into the furrow as it passes, by two or three men mounted on the load; or, it is thrown out in heaps, and afterwards distributed in furrows. The plow-team remains at rest, while these furrows are filling, when it is again set in motion, covering the manure by splitting the ridges on one side, laying out five new furrows on the other—the manure in the mean time being spread into the second five furrows. In this way, all move on together without loss of time, until the field is completed. If two furrows are required for making each drill, and for covering the manure, only one-half the force will be needed for drawing the manure. It is obvious that no plowman should be employed, who cannot lay a furrow as straight as if dug by spade and line. Most English plowmen can do this, and some Americans. Some will determine the width of the drills, accurately with the eye, while others will need a measure, the most convenient being a pole, long enough to extend across several drills, with a mark for each. Applying this occasionally as a test, will soon enable the plowman to dispense with it altogether.

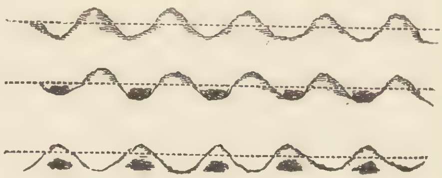
Fig. 2.—*Mode of Manuring Drills.*

[Fig. 2, shows the drills, with manure covered on the left, uncovered in the middle, and unmanured on the right. Figs. 3, 4, and 5, are profiles of the furrows in the three stages.]

Fig. 3.

Fig. 4.

Fig. 5.



The Three Successive Stages of Forming Manured Ridges.

The quantity of manure to be applied in the furrows, will vary with circumstances — a medium amount will be a strip six inches wide and 1 inch deep, requiring about twenty-seven cubic yards or loads to the acre. A larger amount may be used if it is pulverized compost, or if the soil is quite heavy. Bone dust and superphosphate are commonly good fertilizers for turnips, although we have known some soils where the effect was imperceptible. Five to eight hundred pounds of the former, or half as much of the latter per acre, are suitable quantities—to be sown in the drills; 500 pounds being at the rate of about one pound for forty feet of drill.

SOWING.—Success in raising the young plants depends greatly on the condition of the soil, when the seed is put in. It is a common practice to pass a light roller over the fresh ridges to level down the sharp peaks, and to allow the seed drill to pass smoothly and evenly. This rolling

should not be done when the soil is so moist as to pack or adhere together,—it is best to postpone the ridging and planting a week or two. In England, where turnips are extensively cultivated, seed-sowers are made, to be drawn by one horse, planting three ridges at a time, and smoothing the whole surface with a roller having a concave place to fit each ridge. In this country, where these drills are not furnished, a single ridge is drilled at a time. In cool weather, the seed will come up in eight or nine days, and, in hot weather, in five days; it is always best, therefore, in order to escape the fly by rapid growth, to wait till the warm weather towards the middle of June. The depth for the seed should not be over three-fourths of an inch, unless the soil is very dry. Where labor is cheap, a large quantity of seed is sown, requiring much thinning by hand; but if the soil is in good condition, one pound or so will do for an acre.

Sowing Broadcast.—The advantages of sowing broadcast, are, the rapidity with which it may be done, (requiring only a light brushing to cover the seed,) and its adaptation to new, rooty, or stumpy land, where drills cannot be formed. The disadvantage is the necessity of doing all the hoeing by hand. To prevent too much labor in thinning, the seed should be sown thinly and evenly—one pound of good seed to the acre, on good land, will probably yield ten times as many plants or more, as should remain, the distances from each other being twelve to eighteen inches. Novices always leave the plants too thick, and small tubers and a poor crop are the result.

The Turnip Fly.—This insect often proves very troublesome by eating the plants when they first appear. One remedy is to push the plants by manure, as already mentioned; another is to make a smooth surface to the land, either by fine pulverization or rolling. We often observe the crop destroyed on cloddy portions of the field where this insect finds a ready hiding-place; while on lighter parts of the same field, where the harrow has left a smooth surface and no clods, the crop entirely escapes. A cultivator of the common, flat turnip always succeeds in preventing the attacks of the fly by first covering the ground wtth old straw and burning it before sowing the seed. This could not be adopted for large fields, but is only applicable to small patches. The same result occurs on new land which has been burned over in clearing.

Cultivation and Thinning.—As soon as the young plants are an inch in height, cultivation should be commenced. A narrow cultivator will pass evenly between the rows, being kept in position by the ridges on either side. These ridges (fig. 6,) will allow the cultivator to pass much nearer with safety than on level ground. When the plants are two or three inches high, the small, narrow, untouched ridge (fig. 7,) con-

Fig. 6.


Fig. 7.


Ridges, before and after Cultivating with Horse.

taining them (which is about 4 inches wide and 2 or 3 high,) assists greatly in rapidly thinning them to the proper distance. The ground should, therefore be always ridged, even if not manured, in the ridges. If the land is rich, they should be about one foot apart in the row. The hoe used for this purpose (fig. 8,) should have a blade nearly at right angles to the handle, and not incline towards the operator as in common hoes, (fig. 9.) This enables him to do effective work both in thrusting and drawing, as he levels the small ridge for thinning and removing weeds. One hand will, in this way, go over one-third of an acre in a day. If the land is clean another slight hoeing is all that will be needed; but the horse and cultivator should be passed through as often as once a week, so long as the increasing size of the plants will admit. A cultivator made on purpose to take three rows at once with one horse, or four rows with two horses, would be a great improvement and save much time.

Fig. 9.

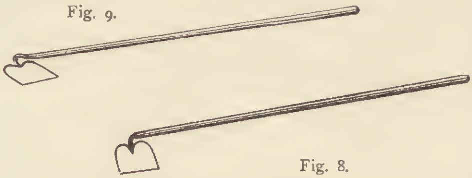


Fig. 8.

W. Anderson, of Rockford, Ill., gives the following description in the COUNTRY GENTLEMAN, of a single cultivator used by him:—"The best cultivator I have used, is one I had made to order, having a broad share 12 or 15 inches wide, cutting both sides alike, and two curved knives two inches wide in the blade, adjustable to any width of ridge. In the side pieces, I have seven harrow teeth, three on either side, and one in the centre, which will effectually cut up all the weeds and leave the land in excellent condition, and may be run so close to the turnips that there is no need of side hoeing."

It should be always borne distinctly in mind, that Ruta Bagas, (as well as all other roots,) can be only raised at a profit, by keeping the weeds completely under. Allow them once to get the mastery, and you are certainly beaten for that year. [The accompanying figures show the differences between a clean and a weedy crop—Figs. 10 and 11.]

Fig. 10.—*Well Cultivated Root Crop.*

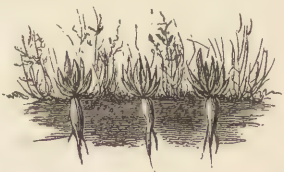


Fig. 11.—*Root Crop Grown among Weeds.*

HARVESTING.—The Ruta Baga is a late grower, and is not injured by slight frosts at night. In the more Northern States, harvesting should

commence by the first week in November; as far south as New-York city, it may be left till the middle. Several different modes have been adopted. Where the patch is not large, the roots may be drawn from the ground, by means of the turnip hook, represented in the annexed figure, (fig. 12.) The tops and roots are then cut off with a large knife—the best is made of an old scythe blade, about ten inches long, the weight being sufficient to strike off the top at a single blow. The operator holding the root in his hand, first cuts the top, then quickly turns the root and strikes that off without changing his grasp. In this way the work is done rapidly. On a large scale the tops are cut off before pulling, by means of a common broad hoe, ground sharp. A good way is for two workmen to work together, each taking two rows, raking the tops with their feet into small heaps, and then placing the tops in larger heaps in the outside row,—a few turnips being first pulled up, to make places for these heaps. If each workman stands between his two rows, the motion of his hoe will throw the tops together at his feet. When they have made one "round," there will be two rows of tops, in the two outer of the eight rows, as shown in the accompanying figure, (fig. 13.) The turnips when pulled, are thrown in small heaps, between each set of two rows, also shown in the cut. The wagon or cart may thus pass between the rows of turnips, without interfering with the tops.

Fig. 12.—*Turnip Hook.*

Fig. 13.—*Harvesting Turnips.*

In large fields, the turnips are loosened and lifted more expeditiously by means of a flat-bladed plow, the share being sharp, and passing directly under the row of turnips. An experienced workman will determine by the feel or motion, the exact depth at which the plow should run. Some plows may have the mould-board removed, leaving the share remaining, and forming what is termed a skeleton plow, which answers well for this puprose.

The roots always keep better, when clean and dry, before housing or heaping for winter. If placed in a cellar. rolling them down an inclined iron grate or rack, will assist much in cleaning them of earth. Fig. 14, represents such a grate, and is made by placing two pieces of joists about two feet apart, and connecting them at the

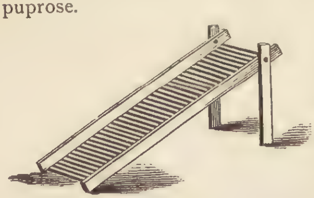


Fig. 14.—*Grate for Conveying Turnips to Cellar.*

lower edges, by means of iron bars set on edge, and running across.—The bars may be let into the lower edges of the wood by sawing, and kept to their places by strips nailed afterward. The bars should be about two and a half inches apart.

Large masses of Ruta Bagas are apt to heat and spoil, unless well ventilated. This tendency is increased by dirt and moisture; hence they should not be piled up in a close, damp cellar. The heated fumes, even when the roots do not decay, injure and rot the timbers. When, therefore, it is necessary to store large quantities in cellars, the roots should be kept at least one foot above the cellar bottom by stout wooden grating, made of scantling or rails; and if a similar grating separates the roots a foot or two from the side-walls, all the better. Unless the weather is quite cold, the air should be allowed to flow in at the open windows, and passing round among the roots, will preserve them in sound condition, and prevent the decay of the timbers of the building. Unless this precaution for ventilation is taken, cellars should be made separate, with a double roof containing a stratum of straw.

Ruta Bagas keep well in heaps out of doors, if properly ventilated, and not in too large masses. The heaps should be oblong, four or five feet wide at the bottom, and as high as they can be smoothly piled. Cover the heap well with straw, and with just enough earth to keep it to its place till the near approach of winter, when several inches of earth may be added. If eight or ten inches of packed straw can be used, the earth need not be more than four or five inches thick. If only half that quantity of straw is to be had, throw on eight or ten inches of earth. These remarks apply to the more northern winters; farther south, less covering is required.

Ventilation of the Heaps.—The turnips will be sure to spoil in these heaps if buried up close without ventilating holes. The moist, warm air will ascend and the roots will be found spoiled all along the top, if not through the whole heap. A common way is to make a row of holes, a few feet from each other, along the ridge, by means of crow-bar, and then partially stop these holes by wisps of straw, which will allow the foul air to escape. A better way is to place pieces of pipe tile for these holes and embank the earth around them, (fig. 15.) They may be loosely or tightly stopped with straw, at pleasure. Where the amount of cellar room is small, the main crop may be thus stored in heaps, and a few loads drawn to the cellar at a time, when a mild day occurs.

Fig. 15.—*Heap of Ruta Bagas.*

Cost of Raising.—Estimates of the cost of production, will of course, vary much with circumstances, condition of land, cost of manure, &c. The following figures for an acre, may therefore, be varied to suit different localities:

Eight harrowings in autumn,	$ 2.50
Two plowings,	3.00
Twenty loads of manure for autumn,	20.00
One plowing and two harvestings in spring,	2.00
Twenty-four loads fine manure for ridges,	32.00
Ridging, drawing and spreading,	4.00
Rolling and drilling,	1.00
Seed,	1.00
Cultivating with horse,	2.50
Hand-hoeing,	4.00
Harvesting,	5.00
Interest on land,	4.00
	$81.00

This treatment on good land would give an average of at least 800 bushels per acre—we have known a product of over 1,200 bushels. One half the cost of the manure should be deducted, for its benefit to succeeding crops—leaving $65, the cost of production—or 8 cents present currency per bushel in the cellar. On many pieces of land, one manuring will be enough; and manure may be frequently had at lower rates—all of which would affect the estimate. In extreme cases, the cost has not been more than 3 cents per bushel.

In conclusion, every cultivator should bear in mind the three great requisites for success, namely:

1. Thorough eradication of weeds, by previous cultivation.
2. Copious manuring with thorough intermixing.
3. Ridge culture, to lessen cost of hoeing, and urge on young plants by manure.

These rules will apply to raising carrots and beets, which require a similar management in most particulars.

A Place for Every Tool.—One of my old neighbors who long ago ceased to exist, was accustomed to keep all his tools in, or near the path from the house to the barn. If they were not found somewhere between those buildings, no one knew where to look for them. Another neighbor had a wooden pin driven into a post, beam, or girt of the barn or work shop, and every one who used a tool, understood that it was a part of his day's work to put up his tools. If he were using a hand-saw every five minutes, it must be hung on its appropriate pin when not in use. When a hand-rake was not in actual use in the barn, he or any one else knew exactly where to find it. Every scythe, and every hand-hoe, was cleaned and wiped dry at night, and put in its place whenever it was used during the day, with as much care as if such tools were not to be used again till the next season. This excellent practice preserved the tools, and saved no little perplexity in putting rusty tools in order, and searching for them, after they had been left in some forgotten corner. Progressive farmers keep their tools and implements in order, always provide places for them, and make it a point to have them returned to their places when not in use. S. E. T.

A CHAPTER ON VARIOUS PRACTICAL SUBJECTS.

[Written for the Annual Register by S. Edwards Todd.]

Couch Grass and its Extermination.

THIS GRASS, *Triticum repens*, is known in different parts of the country, by different names, as *quitch* grass, *quick* grass, and *quack*, or *quacking* grass. Perhaps it is alluded to as *quack* only, by a larger proportion of the rural population, than by any other name.—The illustration herewith given, (fig. 1,) will furnish a fair idea of one stem and the roots. This grass is a perennial, and spreads rapidly by its creeping root stocks; and in two or three years, will often supplant all other kinds of grass. The roots form a thick and extremely tough sod, which it is difficult to plow, unless the slices are cut loose with a sharp coulter, and the plow is run below most of the roots. The grass grows exceedingly rank and luxuriantly; and animals, when hungry, will eat it with avidity, for a few minutes. Yet, I have always observed, that when

Fig. 1.—*Quack Grass.*

small plots of the *Triticum repens* were growing in my pasture fields, other kinds of grass would be grazed short, while the couch grass was still large. It is a coarse, harsh grass, and will make only a second or third rate pasture, or hay. My cattle would always eat the hay made of this grass, as if it were good; but I usually observed, that my milch cows would invariably select all the other kinds of hay, first, and eat the couch hay last. I am satisfied that this kind of grass will make only an inferior quality of hay; and I think, if any one would try the experiment of feeding a cow with a few hundred pounds of this kind of hay, and then the same number of pounds of good timothy, or red clover well cured, he would find that couch grass hay will yield one-quarter less butter or cheese, than any other kind of good hay.

As couch grass is such a gross feeder, and grows so quickly, it is almost impossible to raise a crop of cereal grain, or a crop of roots, where "quack" abounds. Therefore, it becomes necessary to exterminate this noxious weed, root and branch, before the land can be cultivated with profit.

The most effectual way of exterminating this kind of weed is, to drain the land first, if there is an excess of moisture. If the soil is heavy, plow it neatly and deep in late autumn. The next spring, put on a good cultivator with sharp teeth, that will run not more than two, three, or four inches deep. Go over the field every two weeks. Do not allow the teeth to run so deep as to tear up the sod. About the middle of July, or first of August, the sod will be thoroughly rotted, so that the roots may be raked out with the "quack rake," herewith represented, fig. 2. During hot weather, let a team be kept moving with such a rake, until the roots are all raked to the surface of the ground in winrows, which may be collected in heaps, after they are dry, or allowed to remain on the ground. A few hours sunning in August, will destroy their vitality.

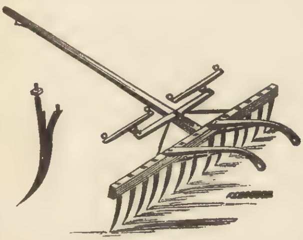


Fig. 2.—*Couch Grass Rake.*

Dimensions of the Rake.—Those that I have seen in use in Central New-York, where such rakes are considered the best thing in use for killing couch grass, consisted of a head about four inches square, of hard and tough timber, four feet long. A strong tongue braced, is secured to this head, which has iron teeth inserted in it about four inches apart. The teeth are made of the best kind of iron, about three-eighths of an inch thick, and an inch and a half wide in the widest place. One tooth is shown of a desirable form, which will enable a blacksmith to make them. The forked portion merely enters a hole about one inch deep, to operate as a brace. With the illustration and these dimensions before him, a mechanic will be able to make one without difficulty.

Universal Fetters.

The illustration shown in connection with this article, represents a style of fetters (fig. 3,) that every farmer will find to be of great practical utility. They are made of different sizes, to fit the size and kind of animal to be hoppled. When on the farm, we found this kind of fetters of excellent service; and those who are in doubt about the utility of employing them for sheep or neat cattle, may rest assured that they are valuable, and worthy of general introduction.

Fig. 3.—*Fetters for a Kicking Cow.*

When I kept a bull, his fore legs were usually fettered when he was turned into the field. The chief object of the fetters was to prevent coupling with any cows, or heifers, which we desired to keep from the male. When the services of the animal were required, the fetters were removed from one, or both legs.

It will be perceived, that if a bull's fore legs be connected with a chain one foot long, it is utterly impossible for the cow to receive him. And the same is true of rams. If their fore legs be connected with fetters, so as to allow them six or eight inches play, rams and ewes may run together always; and no lambs will be dropped at an untimely season of the year. When a farmer has but one ram, by putting fetters on his fore legs, he will find it much more convenient, and better for the ram also, to allow him to run with the flock, than to be confined alone in a small enclosure.

There should be a swivel in the chain to prevent twisting into kinks, as the animal will sometimes throw his feet over the chain, as he walks. The pieces of leather that buckle around the fore legs should be strong and broad; and the buckles, two or three on each piece, should be secured to separate pieces of leather sewed firmly to the outside of the large pieces of leather. The end links of the chain should be made like a cock-eye for traces of harness.

Wooden Stable Forks.

Steel manure forks having sharp points, are very unsuitable tools to be used in cleaning the stalls of horses and horned cattle, except in the hands of men who are always extremely careful in handling such tools. Careless boys in their booby-hood, and heedless men, who are about as liable to thrust sharp fork tines into an animal's legs, as into the bedding beneath them, should never be allowed to have any steel forks in the stable. We have known valuable horses rendered almost worthless simply by a wound in the leg with a steel fork. We have in mind a beautiful horse of a neighbor, which for more than a month was unable to use one leg, into which a fork tine had been thrust when a boy was bedding the horse.

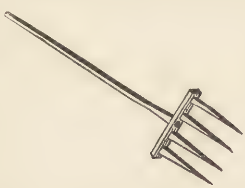


Fig. 4.—*Wooden Stable Fork.*

The preceding engraving, (fig. 4,) represents a wooden stable fork for forking over the bedding, especially when an animal is in the stall. The head should be made of hard, tough timber, about eight or ten inches long, two inches wide and one inch thick. An old broom handle, or piece of a rake stale will be sufficiently strong for the handle, as the fork is not expected to possess sufficient strength for pitching manure. A cross piece may be secured at the end of the handle, if desirable, to enable the person handling it, to keep the fork from turning over, when in use. The tines should be eight or nine inches long, nearly round, half an inch in diameter at the large end, and about one-fourth of an inch in diameter at the small end, dressed off round and smooth so that they will enter the straw easily.

In order to give a suitable degree of "hang" to the fork, let the tines be inserted within three eighths of an inch of the bottom of the head, while the hole for the handle should be bored within half an inch of the of the upper side of the head. A careless thrust with such a fork, would simply bruise the skin of an animal, but make no flesh wound.

How to Drop Potatoes.

Most farmers, when dropping potatoes, render hard work more laborious and fatiguing by the tiresome manner of carrying their basket. By having a basket suspended by a wide strap around the neck, as shown by the illustration accompanying this article, (fig. 5,) both hands will be free to drop potatoes ; and the aching of arms, so much complained of, when a basket is carried in the usual manner, is entirely avoided. Moreover, when the basket of potatoes is suspended by a strap, a laborer will be able to drop the seed with far greater rapidity than if he carries the basket on his arm, as he can then drop with each hand. An active man will usually drop the seed in two drills, about as fast as the person by his side who carries his basket on his arm, can drop in one drill or row.

Fig. 5.—*Potato Dropper.*

When plucking apples from the trees, by suspending the basket from the neck, as illustrated, a person may clamber in the tree tops with far greater facility than with a basket in hand, or hung on branches by means of hooks. A piece of stiff wire may be used for making the hooks required at the ends of the strap. On a high ladder, or in a tall tree-top, a person should have the free use of both hands, both for plucking fruit and holding himself in place.

A Portable Water Barrel.

On almost every farm there is usually a large quantity of water to be transported from place to place, which may be greatly facilitated by simply hanging a water barrel between two light wheels, as represented by the illustration herewith given, (fig. 6.) A pair of the forward wheels of a light carriage would be just what is needed. A strong cider, beer or oil barrel may be used, by cutting two square holes through the staves, to receive the axletree, which should fit closely to the orifices, and be secured with nails, having the very small cracks stopped with pitch, or beeswax and tallow. In many instances a farmer could carry one or two barrels of drinking water a short distance, to a few animals, much sooner than they could be driven to the watering place. As the piggery should always stand at a good distance from the dwelling-house, a swill-barrel on wheels, would always be found eminently convenient for carrying all kinds of swill, whether in a solid or liquid state, to the swine's trough. Such a barrel may be appropriated to numerous purposes which I will not mention. A lid is made to fit the top closely ; and two hooks hold it down, so that but little of the contents of the barrel can escape even were it turned on the side. When water or swill is to be poured into other barrels or tubs, fix a temporary inclined plane with two planks for the wheels to roll on, and having trundled the vehicle to the desired height, block the wheels and elevate the pounds, so that the barrel may be turned top-end down, if desirable. Such a "go-cart" or "one-hoss shay" is often far more convenient for transporting sand a short distance, or some other materials, than an ordinary wheel-barrow. A pair of wheels four feet in diameter, are preferable to those only three feet in diameter, especially when the way is not smooth as a plank floor.

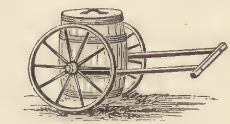


Fig. 6.—*Portable Water Barrel.*

A Convenient Wood-Jack.

One of the most convenient kinds of Jacks for holding fire wood, when splitting it into suitable billets for the cook stove, is shown by the illustration herewith given, which represents a section of a hollow log, about ten or twelve inches long, secured to a piece of thick plank by means of four wooden pins passing through the plank into, or outside of the hollow piece of the log.

Fig. 7.—*Wood Spliting Jack.*

Almost every farmer meets with hollow trees that are so exceeding tough and hard to split into firewood, that pieces of them are good for no other purpose ; and they will last a long time, as the grain of the timber appears to be almost doubled and twisted together. Sometimes, if the grain of the wood is straight, so that one blow with the axe will open the log, a billet of hard wood should be pinned on the upper end, to receive

a part of the blow of the ax, whenever it passes through a billet of firewood more easily than the laborer anticipated.

Such a Jack greatly facilitates the labor of splitting firewood into small sticks, as the person splitting is not required to stoop down and adjust the billet every time the ax cleaves off a stick, as he is usually required to do, when he splits wood without a jack. A billet is placed on the end in the Jack, when the ax is applied until the entire billet is reduced to small pieces. Then, instead of stooping to pick up every stick separately, he stoops but once to remove them all from the Jack. In the absence of such a log, a Jack may be made of round or square pieces of wood, with an opening between the side pieces, called a bench wood-jack.

How to Handle a Shovel.

"A man of skill applies a lever—moves it at his will."

As shoveling is such laborious and fatiguing work, every laborer should aim to derive aid of all the mechanical advantages that may be available, for the purpose of rendering such labor less fatiguing. And the same is true when pitching compost. In order to work with a shovel, or manure fork with little fatigue, that part of the labor which requires the exercise of the most muscular force, should be performed with the tool operating like a lever.

Fig. 8.—*How to Handle a Shovel Easily.*

The illustration herewith given (fig. 8,) represents a laborer shoveling with the handle of the shovel across one knee, which is the fulcrum, the weight being on the shovel, and the power, the hand near the end of the handle. By placing the handle across one knee, the shovel is driven into the material to be shoveled, by a forward motion of the body, which requires very little muscular force.—Then, by a downward thrust of the hand near the end of the handle, the weight is raised one foot or more, with the expenditure of a very limited amount of muscular force.

This principle should be explained to boys and awkward laborers, both when they are pitching manure, or shoveling earth ; and at the same time, the fatiguing labor of shoveling, or pitching any material with a tool having a short handle, should be fully explained. With a short handled fork or shovel, the labor must be performed almost entirely by muscular force, which causes great fatigue to perform but little work.

There is another consideration worthy of notice, which is, when a laborer bends his body over to lift a shovelful of earth, the fatigue caused by only the motion of the body will frequently be fully equal to the fatigue produced by the labor performed.

This thought will, doubtless, be sufficient to prompt laborers, when

shoveling or forking, not only to have tools of the most desirable form and dimensions, but to learn how to use them most effectively and with the least fatigue.

Wooden Snow Shovels.

When shoveling snow, a person will be able to accomplish three times as much with a neatly made snow shovel, with less fatigue also, than he could do the same work with a dirt shovel. When a spade, or common dirt shovel is used for shoveling snow, the movements of the body and limbs cause more fatigue than the strength employed to shovel the snow. This is laboring at a decided disadvantage. When a laborer simply bends his body forward and moves his arms, as when using a shovel, he experiences certain degrees of fatigue, even if he performs no labor. Therefore, by having a large and light shovel with which he can raise a suitable number of pounds of snow, he is able to accomplish a vast deal of labor, with little fatigue.

Fig. 9.—*Snow Shovel.*

The illustration herewith given (fig. 9,) represents a wooden snow-shovel, the blade of which is of some hard wood, not more than three-fourths of an inch thick, sixteen inches long and thirteen wide, with the entering edge dressed down to an even thichness of one-eighth of an inch, and covered with thin sheet iron, extending back three or more inches on the under side, and one inch on the upper side. The end piece should be of hard wood, three-fourths of an inch thick by one and a half inches wide, secured to the *upper side* of the blade, instead of being nailed to the end, as such shovels are usually made. If the end piece is secured to the upper side, it operates as a cleat to keep the blade from warping. When the piece is nailed against the end of the blade, all the strain, when the shovel is in use, comes directly on the few nails that hold it. For this reason a shovel will not last half so long with the end stick nailed to the end, as it will when on the upper side.

The handle may be made of a piece of any light timber, dressed out eight square; or a turned fork handle may be used. Two wood screws secure the handle to the blade. When the blade rests flat on the floor, the end of a handle four and a half feet long should be about twenty inches from the floor. This will give the shovel "the right hang." When such a shovel is used in the barn for shoveling chaff, or cut fodder, narrow pieces are nailed to the sides, either perpendicularly, or flaring outwards. Such a shovel is often much preferable to a small scoop shovel.

Washing Sheep.—A farmer who brook-washes his sheep till the water runs perfectly clear from the fleece, says that his wool nets him in the market from 6 to 8 cents per lb., more than the imperfectly washed wool of his neighbors.

GARDEN INSECTS.

By Asa Fitch, M. D., State Entomologist, Salem, N. Y.

I HAVE RECENTLY been giving particular attention to the insects which occur in our gardens. I have endeavored to ferret out their history, their transformations and habits, and ascertain what it is that attracts them to this situation. Although my researches are still incomplete, I have detected some important depredators which are not mentioned in any of our Treatises on Gardening. And on coming to discover the larva state of some others which are already known to be injurious, I find them attacking our garden plants in ways not heretofore suspected, whereby they become enemies of more importance than they have hitherto been regarded.

And I propose, through the medium of the Register of Rural Affairs, to present a plain and familiar summary account of the chief injurious insects which are common in our gardens, with such illustrations as will, I think, serve to give the reader a clear and correct view of them.

Preliminary to this aecount, it is necessary to apprise those who are not already somewhat conversant with the Natural History of Insects, that this class of animals, with but few exceptions, all pass through four distinct states or stages of life, in each of which the same species is quite different in its external form, and also in its habits, from what it is in its other states. These stages are, first the *egg*, which is succeeded by the *larva* or growing state, when it is commonly a worm, grub or caterpillar, followed by the *pupa* or dormant state, and finally the *perfect* or winged state, when it is a fly, beetle, miller or the like.

To render the subject more distinct and familiar, it will be well to first present a somewhat full and particular account of some insect, describing its appearance and habits in each stage of its life, whereby the reader, without a similar recital in every instance, will be aware that something analagous occurs in the case of each of the other insects which we mention. For this purpose we will select one of the most important of our garden insects, the Onion-fly.

This insect, which received its original scientific name, *Anthomyia Ceparum*, from Linnæus, is one of the most pernicious pests in our gardens, it being the parent of the white "grub" as it is frequently termed, though as it has no distinct head, it is more properly a "maggot," which bores into and destroys the root of the onion. It has infested the onion in Europe from time immemorial, and has been in this country forty years or more, invading one section after another, greatly injuring or totally destroying the onion crop, and probably never entirely disappearing from any district where it has once obtained a lodgment. In many parts of New-England and New-York, it was extremely numerous and destructive about the year 1854, and again in 1863.

In June, as soon as the young seedling onions are some two inches high, the maggot begins to infest them, and continues through the whole season, one generation after another getting its growth and coming out in its perfect state, whereby some of the flies are liable to be always present in the garden, in readiness to deposit their eggs, and maggots of widely different sizes are usually found together in the same onion.

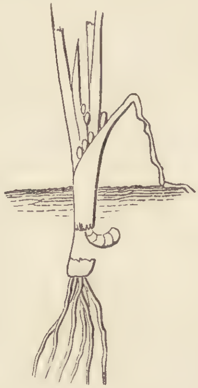


Fig. 1.—*Young Onion, with Eggs, a Maggot Feeding, and the Root cut asunder by it.*

The eggs or "fly-blows," are loosely placed upon the onion slightly above the surface of the ground, as shown in fig. 1, some of them being dropped along the thin edge of the sheath or collar, which is formed by the base of the lower leaf clasping around the main stalk, and others are crowded into the crevices between the leaves slightly above where they issue from this sheath. From two to six or more eggs are placed upon particular plants, scattered here and there through the bed. They are perceptible to the eye, being white, smooth and oval, as seen on the left side of fig. 4, where they are represented their natural size and magnified.

The minute worm or larva which hatches from each egg, eats its way downward inside of the sheath, its course being marked by a discolored track till it reaches the root, on which it feeds till it is wholly consumed, only the thin outer skin remaining. A small young onion furnishes but a portion of the nourishment which one worm requires for its growth, and usually there are several worms feeding together upon the same onion. Therefore, when it is consumed, if there is another onion growing in contact with the first, or nearly so, they readily discover and invade it. But if no onion is growing near the first, they are obliged to scatter themselves, each crawling about in the ground until he chances to come to another onion, or to one of its slender rootlets, which will serve to guide him to the thick root from which it issues.

The first indication we have that our onion bed is invaded by this enemy, we discover a vacancy in one of the rows, where two, three or more of the young plants are withered and lying flat upon the surface of the ground and faded to a yellow color. And the plant next to these prostrate ones, probably has its outer leaf similarly wilted and drooping, as indicated in fig. 1, though retaining its green color, while its other leaves are erect, and to the eye appear perfectly healthy; but on feeling them we find they are soft and flaccid, not stiff and firm like the leaves of the unaffected plants. Thus by feeling the leaves we can readily detect those plants which have worms present in their roots.

On examining the roots we find the operations of the worm vary more

or less in different instances. Sometimes a small round hole is bored either in the side or the bottom of the onion, and only one worm is present. More commonly several worms of different sizes are found, and if the root is small and cylindrical, it is cut completely asunder, as represented in fig. 1; if it is larger, and beginning to swell out into a round bulb as in fig. 2, we commonly find an orifice opening into an irregular cavity in the centre, and the earth around this orifice is wet and slimy, forming a mass of filthy mud, in which the worms are lying when not engaged in feeding. All of the root from being thus perforated and gnawed, soon perishes and becomes soft and putrid, except its bottom part, which, continuing to be nourished by the thread-like rootlets, remains sound, and the worms thereupon crowd themselves into this part to feed, whereby it sometimes presents the appearance represented in fig. 3, being thronged with worms wedged together side by side in a compact mass, all with their heads downwards, eagerly consuming the last remains of food they are able to obtain there, and only the rounded hind ends of their bodies exposed to view, and forming an even surface analagous to the cobble stones of a street pavement.

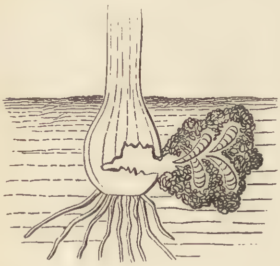


Fig. 2.—*Vertical Section of a Diseased Onion and the mass of muddy slime beside it.*

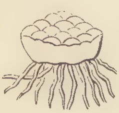


Fig. 3.—*Bottom of an Onion crowded with Maggots feeding downward.*

Multipliers, escallions, and old onions, set out for raising seed, are about as liable to be attacked as are the small seedling plants. And in some cases there would seem to be something peculiar in particular onions, which attracts these insects to them in prodigious numbers. Thus an escallion a few weeks after it was planted out, having wilted and turned yellow, its root was found on examination to be a putrid mass of a most offensive smell, and everywhere thronged with these maggots of all sizes. I judged there was at least two hundred of them in this root, which was little more than a half inch thick. And though there was no sustenance remaining for them, unless they feed on the putrid as well as the sound substance of the onion, every crevice above ground around the bases of the leaves was occupied with eggs recently laid, to the number of nearly fifty.

The larva is represented in the two middle figures of the following cut, fig. 4, the upper figure showing its natural size and the lower one as it appears under a magnifying glass. It is dull white and shining, soft and flesh-like, cylindrical and tapering to a point at its forward end when at rest, more tapering when it is elongated in crawling. Frequently a pale brown movable streak or cloud, produced by internal alimentary matter,

is seen on the hind part of its back. Its hind end is cut off obliquely, forming a flattened surface, on which, slightly above the centre, are two elevated dots of a cinnamon yellow color, and appearing somewhat like a pair of eyes. And around the margin are eight small projecting teeth of which the two lowest ones are largest, and a little forward of these, on the under side, are two additional teeth, like minute feet, by the aid of which the maggot shoves itself forward when crawling.

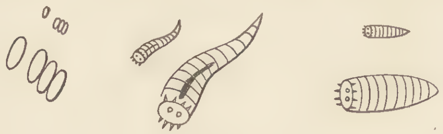


Fig. 4.—*Onion-fly Eggs, Larva and Pupa, natural size and magnified.*

The larva grows to its full size in about a fortnight after it hatches from the egg, and is then so plump and gorged with food, and its skin so distended and glossy, that it appears to be too obese and lazy, in many instances, to exert itself sufficiently to make its way out of the onion, and accordingly composes itself to rest there during its pupa state. But as it is liable to be disturbed by other maggots moving around and rubbing against it if it remains inside of the onion, it more frequently crawls out into the wet slimy earth which is in contact with the root. It then refrains from any motion, and gradually becomes contracted and shorter in its length, its skin grows hard and leathery and changes to a tarnished yellow and finally to a chestnut color, with a stain of black at each end. It is now in its pupa state, appearing as represented in the two right hand figures of the cut fig. 4, its hardened outer skin forming a pod or case, inside of which and wholly separated from it, the real pupa lies, very white and soft, and showing on its surface the wings and legs of the future fly in this rudimentary state.

The insect now remains motionless and asleep as it were, in its pupa state, about two weeks,—the time varying, being shorter when the weather is hot and longer when it is cool. It then breaks open the hard outer shell-like case and comes out from it a fully formed fly, similar to the common house-fly, though when the two are placed side by side you see this is considerably smaller and more slender in its form. It is represented, magnified, in the accompanying cut (fig. 5,) the cross lines underneath showing its natural dimensions. The two sexes are readily distinguished by their eyes, which in the males are close together, and so large as to occupy almost

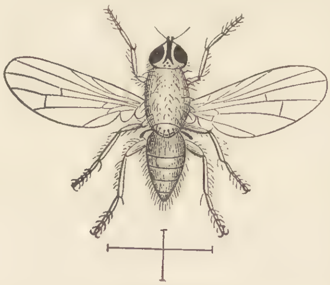


Fig. 5.—*Onion-fly.*

the whole surface of the head, whilst in the females they are smaller and widely separated, as shown in the cut.

These flies are of an ash-gray color with the head silvery white, and a stripe between the eyes which is narrow and black in the male, broad and brown or rust-color in the female, with its forked hind end black. It is particularly distinguished from other species, by having in the males a row of black spots along the middle of the hind body, which sometimes run into each other, forming a continuous stripe, whilst in the females these spots are wanting or in some instances are very faintly perceived.

At the close of the season some of the pupæ and probably some of the larvæ also, will be lying in the soil of the onion bed, where they will remain through the winter to complete their transformations, and give out the flies the following spring. Other larvæ nestled in the onions are liable to be taken unobserved into the cellar, where they become nearly torpid with the coolness of the temperature there, making little if any advance during the whole winter, and will be found in the onions when they are removed from the cellar the following spring. Thus these maggots are liable to be present in the onions the whole year round.

Many persons have for a time abandoned the growing of onions in consequence of this enemy; and where it is present in such force as to nearly or quite destroy the crop, we may confidently expect it will be numerous in the same grounds the following year. I have thought in such cases, a farmer by making an onion bed upon some remote part of his lands, where none of these flies will be present, and where there is no garden so near that they will from thence readily find the spot, will probably obtain a crop uninjured by this insect.

As it requires several onions when they are young and small to nourish one maggot till it attains its growth, it is obvious our mode of cultivating onions in close contact with each other, in rows in a bed, accommodates this insect perfectly, enabling it to readily find the amount of food it requires. If instead of this the onions are grown insulated and widely apart, in hills scattered here and there among the other vegetation in the garden, with but three or four plants in a hill—the hills each marked by a stake, that they may not be overlooked and destroyed when hoeing about them—some of these hills will probably escape discovery by the flies; and in none of them can a maggot obtain sufficient sustenance to grow to maturity, when the plants are young. After consuming all the food there, the half dozen small maggots that will be usually hatched in each hill that a fly has visited, will wander away in search of sustenance elsewhere, and crawling around at random underground, will probably perish of hunger before they will chance to find any of the other hills. It would seem that, during the early part of the season, a garden thus managed would become wholly freed from these insects.

When we see the leaves of a young onion wilted and lying flat upon the ground, we know this enemy is at work in that spot, and that unless he is

arrested in his career, every plant in the row, for a distance of twelve or eighteen inches, will probably be destroyed before his operation will terminate. It therefore becomes an important question how this calamity can be averted. Before another day the adjoining plants will be invaded. Some step, the efficacy of which is certain, requires to be promptly taken. Very few of the numerous remedies for destroying the maggot of the onion-fly, which have been made public in our agricultural periodicals, have I regarded as of sufficient promise to be worthy of a trial, and some of this few which I have tested have proved to be worthless. My own practice has been to search out every plant having any of these maggots in its root—every plant, the leaves of which were wilted and drooping, or felt soft and flaccid, and dig down by the side of it sufficiently deep to raise it from the ground entire. These uprooted plants, and any maggots which I come to in the earth around them, I usually place in a tight box or basin, which I set aside, and let the plants wither and the worms in them perish. Even should there chance to be any pupæ in the uprooted plants, they would be unable to complete their transformations when thus treated, for on being taken from the moist ground and exposed to the air, I find the soft white pupa which is lying inside of the hard outer shell-like case, dries away and perishes within twenty-four hours. In this manner, the destructive career of this insect in the onion bed, is immediately arrested. And this uprooting of the infested plants and destroying the larvæ in them, is the only certain and efficacious remedy for this pest which is known to us.

I have been the more particular in giving a somewhat full history of the onion-fly, as some of the most important insects infesting other garden roots, pertain to the same genus *Anthomyia.* These are so closely like this onion-fly, both in their appearance and habits, that little more will now be necessary than to state the few particulars wherein they differ from it.

Before we pass to consider the insects of other garden roots, another common disaster to the onion, to which I find no published allusion, requires to be noticed. During the latter part of June, and in July and August, one onion after another in the bed, ceases to grow, and its top gradually becomes dead and dry, although the bulb is perfectly sound and hard—the plant thus terminating its growth for the season, when the bulb is sometimes no larger than a walnut. Upon raising such onions from the ground, we find they come up very easily, having lost their attachment to the soil by reason of a malady that has affected their small fibrous rootlets, which for the most part are severed from their connection with the bottom of the bulb, whilst others are withered, dry and discolored, very few if any of these rootlets remaining white, succulent and in a healthy condition, capable of contributing to the nourishment and sustentation of the plant. And adhering to the bottom of the onion will somestimes be seen one or more small young CENTIPEDES, or "Thousand-legged-worms," whilst several others of them may be noticed in the hole from which the bulb has been raised. It is these creatures that are the authors of the mis-

chief—wholly cutting off many, and in some instances all of the rootlets, and wounding and girdling others to such an extent that they wither and perish. These worms will be described when we come to consider the insects injuring the roots of the cabbage.

The BEET is quite free from insect enemies. The only one entitled to notice is the STRIPED BLISTERING-FLY, *Cantharis vittata*, a cylindrical beetle scarcely the thickness of a small lead pencil, and half an inch or more long, of a dull pale yellowish color, with two black stripes on its fore body and on each of its wing covers. These beetles occasionally appear in immense numbers, attacking the potato tops and stripping them bare of their leaves. They are equally fond of the leaves of the beet, which are liable to be totally consumed in places where this insect is present. The only remedy is to gather the beetles in pans or covered tin pails, and kill them by sinking the pail in boiling water—when they may be dried and sold to the apothecaries, every intelligent druggist knowing that they are perfectly equal in value as a vesicant to the Spanish Flies of the shops. Fortunately, these beetles only visit us here in New-York, but once in a life time, and remain but two or three years when they do come. In Pennsylvania and Ohio they appear somewhat more frequently.

The CARROT and also the PARSNIP are but little depredated upon by insects. The Negro-fly, *Psila Rosæ*, which produces a yellow maggot that bores the root of the carrot in Europe, and is its worst enemy, has not yet reached this side of the Atlantic, that I am aware. The leaves of both the vegetables named, and also those of the caraway and parsley, are eaten by a large thick-bodied apple-green worm, (fig. 6,) prettily marked with black bands, each band being formed in part by six equidistant yellow spots. Some of these worms are seen in our gardens almost every year on one or the other of the plants named, though the species subsists mostly upon the wild parsnip growing in the meadows and along highway fences. In its pupa state it is curiously held to the side of a post or the wall of an out-building, by a thread passed around the upper part of its body. It finally becomes a beautiful large black butterfly, (fig. 7, diminished from the natural size,) having two rows of yellow spots beyond the middle of its wings, and on the hind pair a row of blue spots between the yellow ones. This is named the ASTERIAS BUTTERFLY, *Papilio Asterias.* It may every year be noticed in the garden gently hovering over one of the above named plants, and settling for a few seconds on the ends of one leaf after another, placing a single egg on the upper side of the leaf. There are two broods each year, the worms appearing early in July and again in August. They may be picked off the leaves and killed, though they are seldom if ever so numerous as to require their destruction.

Fig. 6.—*Parsnip and Parsley Worm.*

The RADISH has its leaves perforated with small holes by the STRIPED

FLEA-BEETLE which infests the cabbage leaves, under which head it will be more particularly noticed. Altogether the worst enemy of this vege-

Fig. 7.—*Asterias Butterfly.*

table is the larva of the RADISH-FLY, *Anthomyia Raphani*, as it is named by Dr. Harris, although it appears to be identical in every particular with the European *Anthomyia radicum*. This larva is a maggot which gnaws irregular spots on the outer surface of the radish, and bores long, winding, yellow worm-tracks in the white interior of the root, whereby it becomes tough and stringy, and unfit for the table. A large portion of the radishes grown in most of our gardens, are hereby rendered worthless, every year, and many persons never attempt to raise this vegetable in consequence of this insect. It is only my earliest sown bed from which I obtain a few radishes that are eatable, and some years this first sowing is a total failure like the later ones. The worm and also the pupa differ in no respect, that I perceive, from those of the onion-fly, (fig. 4,) except that at the hind end the two larger middle teeth upon the underside are slightly notched at their tips, and two-toothed instead of tapering to a single sharp point. The flies, too, are very similar, but in this radish-fly three faint brownish stripes are perceptible on the fore body, and on the hind body in the male is a black stripe along the middle, which is crossed by narrower black lines on each of the sutures.

The CABBAGE appears to be attacked by a greater number of insects than any other garden vegetable, and suffers more severely from these pests than any other plant, the cucumber, perhaps, excepted. Its roots, its stalks, and its leaves each have their particular depredators. These we will proceed to consider in their successive order.

The root frequently has its surface excoriated and its interior bored by the larva of the CABBAGE-FLY, *Anthomia Brassicæ*. This maggot commences its attacks when the plants are small, even before they are taken from the seed bed, sometimes destroying every plant in the bed. It con-

tinues to infest the roots through the whole season. At the time of gathering the cabbages in autumn, I can always obtain specimens of these larvæ, finding them burrowed in little cavities in the bark of the root or sometimes boring directly inward with the white ends of their bodies projecting out from the surface. They prey most severely upon the cauliflowers and other tenderest varieties of the cabbage. In 1856 and '57, this Cabbage-fly was unusually numerous and destructive in different parts of the state of New-York. The larvæ appears to differ in no respect from those of the Radish-fly. The flattened hind end of their bodies have twelve minute teeth around the margin, whereof the two lowermost ones are largest, with their ends notched and two-toothed. And the tooth next to these on each side is equally long but more slender, tapering, and very sharp-pointed. And the flies which I have bred from these cabbage larvæ are so very like those of the radish, as to excite doubts of their being really distinct, from that species, merely having the three stripes on the forebody more distinct and of a black, rather than a brown color. E. SANDERS, in THE COUNTRY GENTLEMAN, May 1857, p. 319, reports that one of the Albany gardeners, had saved his plants from the general ruin of the preceding year, by sifting powdered tobacco upon them, so much only as to lay a fine slight dust on the leaves, and repeating this application whenever the dust was scattered off by a high wind or rain. And he is confident the fly will not alight to deposit its eggs upon plants which are thus dusted. If this is an effectual remedy, it will no doubt be equally effectual against other flies of this genus.

Young CENTIPEDES, or Thousand-legged worms as they are commonly called, also attack the roots of the cabbage, and indeed those also of most other garden vegetables. These creatures are so very small and lurk in such obscure situations during the daytime, that they are scarcely noticed, and no one is aware of the countless multitude of them that are scattered everywhere through the garden. As they are frequently seen associated with the wood lice or "sow bugs," and have similar soft bodies and numerous short thread-like legs, they are currently supposed by the few persons who have formed any definite opinions respecting them, to be analagous to their larger comrades in their habits, and to subsist like them upon dead and decaying vegetable matter. But I find them clustering together and feeding upon living, healthy vegetation of every kind that is soft and succulent in its texture, and that is lying upon or slightly under the ground where it is accessible to them. Being so extremely numerous, so decidedly injurious, and so wholly overlooked hitherto, the leading facts in relation to their appearance and habits, require even in this brief general account to be somewhat particularly stated, for correct public information.

Early in the day, when the earth is still damp from the night dews, if engaged in sowing seeds, uprooting small weeds, or any other garden work which causes us to closely inspect the surface of the ground, we shall fre-

quently see a small brown worm, analagous in its appearance to the following cut, (fig. 8,) but only a quarter or a half inch long, slender and snake-like, flattened upon its back and with a row of short thread-like legs, appearing like a fringe along each side of its body the whole length. It crawls slowly about, here and there, with many short turns, frequently doubling its body almost together. If you inclose it in a dry box or vial, you will find it dead an hour afterwards. But put it in a vial of damp earth or wet moss, and it will live there for months, unless you allow it to get dry. You thus learn that it delights in a damp humid atmosphere, whilst a dry situation is fatal to it. It therefore comes abroad only in the night time, wandering about over the moist surface of the earth, in search of the choicest food it can discover, whilst the hours of darkness remain. But as the morning advances, the sun is drying the top of the ground, and it can no longer continue there. It accordingly travels about till it comes to some crack in the ground, or some crevice under a stone or a piece of board, where the sun's drying rays do not penetrate, and where the earth will continue moist during the heat of day. Into that crevice it enters and there remains, until the dews of night are again falling, enabling it to leave its retreat. Thus on raising up a chip or a piece of board that happens to be lying on the ground in the garden, you will be astonished to behold the number of these worms that are frequently gathered there, so crowded together in one spot, in some instances, as to wholly cover and hide the surface under them.

On inspecting these creatures when thus brought to our view, we shall notice they are of all sizes from a tenth to a half inch in length, the smaller ones being white and the larger ones brown. And they are seen to be of two very different forms. The major part of them are flattened or depressed upon the back. These all pertain to one species and are the young of the FLAT-BACKED CENTIPEDES, *Polydesmus complanatus*, one of the varieties of which has been described as a distinct species by Mr. Newman, under the name *Polydesmus Canadensis*, or the Canada Centipede. This Flat-backed Centipede is represented grown to its full size in the annexed cut, (fig. 8.) The others which are met with, associated with it, are more long and slender, and perfectly cylindrical in their form. They are the young of different species of the ROUND CENTIPEDES, which form the genus named *Julus*. Although these Centipedes are classed as insects pertaining to the Wingless Order, *Aptera*, they differ remarkably from other insects in that they undergo no metamorphosis. The young worm which hatches from the egg, more resembles a larva than a perfect insect, but it never acquires wings nor passes out of this worm form into one that is different and more perfect.

Fig. 8.—*Flat-backed Centipede.*

From what has been above related of their habits, it will readily be perceived that when one of these Centipedes crawls into a crevice by the side

of a root, and finds the white tender skin of the root presenting to it an abundant supply of food, it has no occasion to leave the spot, and will therefore remain there, night and day, until the store is exhausted. And others discovering the supply will join in company with it, until the situation becomes occupied with as many of these worms as can crowd themselves into it. Thus a large spot in the skin of the root is excoriated by them. The cabbage being so tender and succulent is particularly inviting to them. And I think that the disease called anbury or club root, is caused by the wounds on the root made by these insects. The large leaves of the cabbage keep the ground around the root constantly shaded and moist, rendering the situation peculiarly attractive to the Centipedes. Many of the stalks become inclined, by the action of the winds upon their leaves, and hereby a crevice is opened on one side of the root, into which these insects enter and there abide, feeding upon and crowding the exposed surface—keeping up a constant irritation of the part, causing a profuse flow of the sap to it, whereby in the more extreme cases it grows into the knobby canker-like excrescence termed the anbury. I am quite confident this is the manner in which this singular and fatal disease is produced.

These centipedes can be caught quite easily by setting traps for them. Pieces of old boards and large chips placed here and there in the garden, will nightly gather a number of these insects under them. And they are readily killed by cutting them asunder with a pocket knife. But decidedly the best mode of accomplishing the destruction of hosts of these and other noxious insects, is to confine in the garden, under a small coop, a hen with a brood of young chickens. The chickens will be abroad in pursuit of their morning meal, when the centipedes are everywhere crawling over the damp surface of the ground, and few of them will escape being picked up and devoured by these alert little foragers.

One of the saddest and most vexing casualities that is liable to befall the cabbage, is the severing of its stalk by the CUT-WORM. These Cut-worms are the larvæ of a dark colored miller or moth. The particular species which is the parent of the Cut-worms in our gardens here in Eastern New-York, and probably over the country generally, I have recently ascertained to be the *Agrotis nigricans*, which in England is known by the common name of the GARDEN DART-MOTH—the name "Dart-moth" being given to the species of *Agrotis*, from a peculiar mark which many of them have upon their fore wings, having some resemblance to a dart or short spear. Every one will be interested in knowing the exact appearance of this moth, that every few years occasions such serious losses in our corn-fields as well as our gardens. We, therefore, present figures of it, its natural size, as it appears when at rest with its wings closed together, (fig. 9,) and its wings spread as in the act of flying, (fig. 10.) It is of a dark ash-gray color and is recognized by four peculiar spots on its upper wings, two very pale ones and two coal-black ones; their exact shape and position being very accurately shown in fig. 10. These moths appear for

about a fortnight, early in July, flying about by night and frequently entering the open windows of our dwellings; being attracted and bewildered by the bright light of a lamp, in the same manner that a horse is crazed to rush into the flames of a burning building. The moths drop their eggs around the roots of grass, and the small worms that come from them feed underground on the tender roots of the grass and other plants, during the autumn and spring, till they become two-thirds grown about the 20th of May, when they come to require stronger and more nutritious food to finish their growth. They then venture out of the ground by night to feed on the green vegetation above ground, and as daylight approaches they select some tender succulent plant, and cut it off half an inch above the surface of the ground and pull it a short distance aside, where they sink themselves slightly under the surface, and drawing the severed plant gradually in to them they feed upon and consume it during the daytime. It is this curious habit of severing cabbages, beans, cucumbers and other tender young plants, to feed upon them during the long hours of daylight, that renders these cut-worms so pernicious. They cease their depredations soon after the middle of June, and crawl two or three inches deep in the ground to repose a fortnight in their pupa state. Cabbages can be effectually protected against them by rolling a walnut leaf, or even a piece of paper, around the stem when setting out the plants. But except in the case of cauliflowers or other very choice plants, this operation occupies more time than is repaid by the benefit resulting from it, since it is only at intervals of some years that these worms are a pest to us. The best course is to glance over the garden plants every morning, the last of May, and whenever a plant is found cut off, search around it for the roughened spot in the ground where the worm is secreted, and disinter and kill it, that it may not destroy other plants the following nights.

Fig. 9.—*Cut-worm Moth, at rest.*

Fig. 10.—*Cut-worm Moth, flying.*

The cabbage is greatly injured, especially when the plants are young, by Flea-beetles, which perforate small holes in the leaves. Three or four species of these insects occur in our gardens, but much the most common and destructive one is the STRIPED FLEA-BEETLE, *Haltica striolata*, which is represented magnified in fig. 11, the short line on the right side being its natural length. As soon as the seeds of the cabbage sprout from the ground, these beetles begin to gather upon them, and ere you are aware of their presence, it may be that your whole bed of young plants is destroyed. And they continue through the season, though after the third or

fourth leaf of the cabbage is put out, the plant has acquired such strength as to withstand their attacks. Dusting the plants with ashes, plaster, lime, snuff, soot, sulphur, or a mixture of two or more of these, every second or third day while they are young and small, should never be omitted. This repels the insects from the plants pretty effectually, but does not lessen their numbers in the garden. To destroy them the brood of young chickens already spoken of, is invaluable, and it should be the established custom to rear one or more of these broods in every garden each year—removing them when they are grown so large and their supply of insects so diminished that they begin to pick the cabbage leaves or other vegetation. Equally important is it to place in the garden every toad that can be found. We can well tolerate these ill-looking creatures in view of the great number of Onion-flies, Cabbage and Radish flies, Flea-beetles and other injurious insects they will destroy for us.

Fig. 11.—*Striped Flea-beetle*

The GARDEN-FLEA, *Smynthurus hortensis*, another leaping insect, represented in outline greatly magnified, (fig. 12,) with one of its horns still more magnified to show its several joints, is an exceedingly minute insect, smaller than the grains of common gunpowder, which is present in myriads in the garden the fore part of the season. It is soft, black, and destitute of any glossiness. Where a wound is made in a leaf by a Flea-beetle or other insect, these minute fleas become gathered along its edges, where they appear to feed upon the soft pulpy matter of the leaf, which is thus exposed to them, whereby the wound is made larger and is prevented from healing. The remedies for these insects are the same as for the preceding species.

Fig. 12.—*The Garden-flea.*

The leaves of the cabbage are frequently seen having much larger holes gnawed in them than those which are made by the Flea-beetles. These larger holes are made by worms of several different kinds. One of the most important of these cabbage leaf-eating worms which we have in our country, is a species which occasionlly appears in a particular neighborhood in such excessive abundance as to completely riddle the leaves with irregular holes of all sizes, as represented in the accompanying fig. 13. It is a small cylindrical pale green worm, growing to somewhat exceed a quarter of an inch in length, when disturbed wriggling briskly backwards and dropping itself down from the leaf by a thread. When it has completed its growth it encloses itself in a very pretty white gauze-like cocoon, (fig. 14,) with regular meshes like net-work, which is slightly tied to

the leaf, its texture so thin that the pupa (fig. 15, the line on its upper side showing its natural length,) is distinctly visible inside, of a white color. It produces a small delicate moth, which breaks through and crowds itself out from one end of the cocoon, hereby making an open ragged orifice

Fig. 13.—*Cabbage-leaf, as eaten with holes by the Cabbage Moth.*

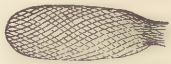


Fig. 14.—*Cocoon of the Cabbage Moth, magnified.*

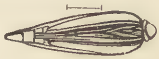


Fig. 15.—*Pupa of the Cabbage Moth.*

as represented above in fig. 14. This moth (fig. 16,) measures nearly six-tenths of an inch across its wings when extended, and is of an ash-gray color, its fore wings freckled with black dots and having a broad wavy white stripe on their inner margin. I have named this the CABBAGE MOTH, (*Cerostoma Brassicella*,) in my First Report on the Noxious Insects of New-York. It coincides so very closely in its appearance and habits with the account given by Mr. Curtis, (Farm Insects, p. 85,) of the *Cerostoma Xylostella*, which in Europe attacks the cabbage and turnip leaves, sometimes making great ravages in the gardens, that it may prove to be identical with that insect.

Fig. 16.—*Cabbage Moth, magnified.*

Our common WHITE BUTTERFLY, (*Pieris oleracea*) measuring nearly two inches across its wings, and which appears in May and June, and again in August, and may be seen hovering slowly over the water radish (*Barbarea vulgaris*) and placing one, two or three eggs on the underside of each leaf, near the edge; if it fails to find a supply of these wild plants in the fields and meadows, will sometimes resort to the cabbages and turnips in our gardens. Its eggs in ten days hatch a small glossy white worm, which as it grows changes to a pale green color. It remains on the underside of the leaf, eating large round and irregular holes through it. But it is never so numerous in our gardens as to require to be searched out and killed.

[The Author has not been able to complete this article in season for the present Number, and the subject will therefore be resumed hereafter.]

SHORTENING WINTERS.

WE OFTEN HEAR COMPLAINTS of the length of our northern winters. Farmers who cannot turn their cattle to pasture until the middle of May, and who have to begin foddering them by the middle of November at the latest, sometimes look with envy at the condition of those farther south, where several weeks are gained at each end of the winter season. It would be much better if, instead of these vain regrets, they should determine to manufacture or modify circumstances to suit their wishes and purposes. There are several ways in which this may be profitably done.

1. Several weeks are often lost early in spring in waiting for the soil to become dry. This is a great waste of valuable time, at a period when every day is of much importance. This waste can be well appreciated, but there is another loss of a formidable character of the heat which should warm the soil, but which goes merely to evaporate the water. The surplus water in one foot in depth of soil often amounts in spring to three inches—equal to more than ten thousand cubic feet per acre. In undrained land most of this passes off by the slow process of evaporation, carrying off a vast quantity of heat which otherwise should go to warm the soil. The amount of heat thus lost may be better appreciated by stating that it is equal to that afforded by the burning of twelve cords of the best seasoned wood, and with no escape or waste of heat.* Every water-soaked ten acre lot, therefore, must require all the heat that could be derived from 120 cords of the best fuel—over 1,200 cords for each 100 acre farm, to evaporate its surplus water in spring. Good and regular tile-draining will carry off this surplus water in three days—after which, all the heat of the sun will go towards warming the soil. We have had occasion the past spring to observe the difference between the condition of a piece of well drained, but naturally heavy soil, and an adjoining piece remaining undrained. The first was in fine condition for working in less than a week after it was thawed. It was necessary to wait nearly one month before the other could be plowed, and even then it was cold and clammy. It will therefore be safe to say that at least three weeks are gained in the length of the season by underdraining heavy soils.

2. We scarcely need to allude to the great mitigation of the severity of winter on all domestic animals by providing good shelter. When we have contrasted the condition of those animals which enjoy warm stables and tight sheds, and are protected by tall screens of evergreens surrounding the yard, with those which are foddered from stacks in open fields, we do not wonder that the owners of the latter complain of the long and severe northern winters.

* A pound of the best wood will evaporate 25 pounds of water, if there is no waste of heat, and 24,000 pounds, or 12 cords, would be required to evaporate 10,000 cubic feet, or 600,000 pounds of water.

3. The same class of managers complain of the slow growth of their pastures in spring, and find that they are unable to turn out their animals from the barnyard until the middle of May, or even later. They could easily gain from one to two weeks by providing better and richer pastures—that is, by seeding down heavily with grass on land which has been well manured, or by top-dressing old grass fields, and especially by protecting the plants which form the sod from the action of cold winds in winter. This may be effected by top-dressing with coarse manure in autumn, by a thin and even coating of refuse straw, and especially by not allowing the grass to be closely grazed on the approach of winter. Any one may satisfy himself on this point by observing the rich and heavy growth of early grass in fence corners, and in other sheltered or enriched spots, while open pastures have scarcely begun to turn green.

4. Belts of evergreens on the more exposed lands will do much towards lessening the effects of sweeping winter winds, to protect herbage, and cause it to grow later in autumn, and come on earlier in spring. An eminent florist once remarked that many tender plants, commonly requiring the protection of a green-house in winter, would survive without injury if planted in woods, where the shelter from winds, and the covering afforded by leaves, nearly prevented the ground from freezing. The same effect, although in a less degree, is afforded by occasional timber belts across farms.

5. Dairymen who are unable to make other than poor white butter in winter, and but little of it, and who complain of winter as an unpropitious season, may overcome much of the difficulty by a good supply of carrots, turnips, beets, &c., which will enable the good manager to manufacture as rich butter in winter as at other seasons of the year.

An observanee of the foregoing five particulars, namely, underdraining, shelter, enriched pasture lands, timber belts, and a good supply of succulent food for cows, as well perhaps as some other points of good management, will reduce the effects of the severity of our northern winters to an amount equal to at least three degrees of latitude, and sometimes much more. Let them be carefully weighed and adopted in practice.

REGISTERING ORCHARDS.

PLANTERS who have set out young orchards should not forget to register the names of all the sorts in a book. It may be done in a common account book, and will then be always at hand, and ready for reference. Commence with a row on one side and proceed regularly to the other; in this way every tree may be found. Planters receive their trees labelled from the nursery, and carefully observe every kind; but in two or three years they forget them, the labels being lost or defaced, and when the trees bear the first specimens, are puzzled to know what they are. They call on some wiseacre, who gives half the names wrong, and misnomers are thus multiplied. Now is the time to register them.

GROUP OF SOUTH-DOWN WETHERS—*Twenty months old, weighing respectively (live weight, Nov.* 25, 1865,) 239 *lbs.*, 224 *lbs. and* 231 *lbs.*

SOUTH-DOWN SHEEP.

THE FOREGOING ILLUSTRATION, engraved for the ANNUAL REGISTER OF RURAL AFFAIRS from a photograph received from England, represents a group of three South-Down wethers, bred by Lord SONDES, Elmham Hall, Norfolk, and fattened by him for exhibition at the Smithfield Club Show, in December, 1865. Here they were awarded both the first prize in their class (£20,) and also the Silver Medal and Cup of an equal value in addition, as the best Down Sheep in any class. We regret that they do not appear to quite the same advantage in the engraving as in the photograph. In noticing them, the Mark Lane Express said: "The Elmhall Hall flock has only once been exhibited before out of Norfolk, saving at foreign shows, yet the present success proves what a high character pertains to sheep bred from Mr. Henry Overman's and Mr. Jonas Webb's stock. Splendid sheep these are, with a greater size and weight and far better backs than Lord Walsingham's, and weighing on an average 224 lbs. per sheep, while the Merton wethers weigh on an average only 209 lbs. per sheep. This lot we take to be the gem of the show, and while your eye and hand approve their form and mutton if you are a judge, you are sure to admire them even if you are not. Critic or not, you cannot withhold admiration from the even character of the beauties in this pen—the exact similarity of each animal to his fellow in form, style of carriage, and color and expression of countenance. This alone is a rare merit, irrespective of the excellence of the individual sheep; as the feeder experi-

ences more difficulty in securing a level set of wethers than a fowl-fancier does in matching pullets for a show."

From a recent sketch of the rise and progress of this valuable breed, we make the following extract:

"Nothing occurred to call the South-Downs into notice until the latter part of the last century, though they are undoubtedly an ancient breed, and probably have existed since the time of the Conquest, as they would be the most suitable stock for the grassy downs before arable cultivation was thought of. Arthur Young, in 1788, speaks of these sheep, admiring their hardy constitution, their usefulness in manuring the land, and the fine flavor of the mutton. At the time when Mr. Ellman commenced work, the sheep were used as the manure carriers from the downs where they fed during the day, to the fallows on which they were folded at night. As the range over which they travelled was often extensive, and the keep at times short, a very active, light-shouldered sheep was necessary, and so long as these conditions remained in force, so long would it be undesirable—nay, even impossible—to make any great alteration in the character of the sheep.

"The introduction of the turnip and other forage crops, by providing better winter food, prepared the way for Mr. Ellman and others. Nothing could have been done but for this crop, the use of which is the turning point in the history of light land. When the sheep had no longer to travel such distances for food, the shoulder could be widened, the back made straight, and well-sprung ribs substituted for flat sides, the bone and pelt reduced, and the tendency to feed encouraged. Sussex is the natural home of the South-Down, and more particularly should they trace back to Mr. Ellman's farm at Glynde, as there can be no doubt that he was the founder of the improved South-Down. It would appear from the record given by his son that the object of Mr. Ellman was somewhat different from Bakewell, who, it will be remembered, went in for weight of carcass and fineness of bone, caring little about wool. These qualities were obtained by Bakewell by careful selection and forced feeding. Ellman objected to forcing young stock, being anxious to keep a strong constitution; and except in particular cases, and where absolutely necessary, he avoided in-and-in breeding, from a well grounded belief that such a practice would inevitably injure the constitutional vigor of the animals."

The merits of the improved South-Down soon drew attention from surrounding districts, and Ellman's sheep, on his retirement in 1829, were sold at prices which were then thought highly satisfactory. His ewes produced an average of £3 1s. 6d.; the rams, twenty-five in number, reached an average of £25, and the ram lambs £10. The late Jonas Webb of Cambridgeshire was the principal breeder who carried on the good work; and at his last sale but one, in 1861, ninety-nine rams, 2 years old or over, averaged upwards of £30 each; 109 shearling rams averaged but a fraction less than £25 each; 199 shearling ewes exceeded £11 each, and the other prices also showed a corresponding advance upon those of 32 years before.

THE AUBURN IMPLEMENT TRIAL.

ONE OF THE MOST IMPORTANT EVENTS of the year 1866, was the Trial of Harvesting Machines held during the month of July, at Auburn, by the New-York State Agricultural Society. Provision had been made for testing the following classes :

1. Mowing Machines for Two Horses.
2. Reaping Machines—Hand Rakers.
2½ do. Self Rakers.
3. Combined Mowers and Reapers—Hand Rakers.
4. do. do. do. Self Rakers.
5. do. do. do. Hand or Self Rakers interchangeably.
6. One Horse Mowing Machines.
7. Horse Powers on the Endless Chain Principle.
8. do. on the Lever or Sweep Principle.
9. Threshers and Separators.
10. Threshers and Cleaners, Combined.
11. Machines for Pressing Hay.
12. Fanning Mills.
13. Horse Rakes.
14. Machines for Tedding (or Spreading) Hay.
15. Machines for Gathering and Loading Hay.
16. Horse Power Hay Forks.
17. Portable Steam Engines for Farm Purposes.
18. Hay and Straw Cutters.
19. Grain Separators.

The classes from 1 to 6 inclusive, comprising Reaping and Mowing Machines, elicited upwards of fifty entries—probably a larger number than ever before competed at a single Trial. In the other classes there was much less competition, and though in several of them results of more or less importance were attained, the leading interest of the whole centered upon the comparative merits of the various patents for cutting grass and grain by horse power. The Trial was opened on the 10th of July, and continued until the evening of the 27th. It was under the charge of Hon. JOHN STANTON GOULD, President of the Society, assisted by an able corps of Judges.

Our space is too limited to attempt much more than a statement of the prizes awarded, with a summary condensed from the Judges' Report of the reasons on which these awards were based. But it may be remarked, before proceeding farther, that since the last great Trial of Mowers and Reapers, (by the United States Agricultural Society, at Syracuse, in 1857,) there has been a gratifying degree of improvement in their construction and effectiveness, in some respects ; while in others they had then attained nearly the same measure of perfection as now.

POINTS OF IMPROVEMENT---THE PRIZE MOWERS.

The *Mowing Machines* now offered to the public have been gradually simplified, as regards both the number and the connection of their various parts, compared with those of an earlier day—not only securing fewer parts liable to derangement, and diminished weight, but greater compactness and portability, and probably also increased directness in the applica-

tion of power. They show greater smoothness and ease of running, and the noise they make in the field is evidently less than ten years ago—involving less liability to breakage and wear. They are more manageable, not only from the arrangement by which the cutter bar is folded over, in transportation, but also while at work—the driver's seat being so placed as to give him a better view and more complete control of the operation of the knives. They are all much less liable to clogging in the field ; and while ten or fifteen years ago it was necessary to start some steps before reaching the grass in order to get up the motion to cut it, now they all begin work as well when their knives are directly in the standing herbage —there is no backing before a start can be had. The side draft which was once seriously objectionable, has been so obviated, that, for practical purposes, it may perhaps be considered as entirely removed.

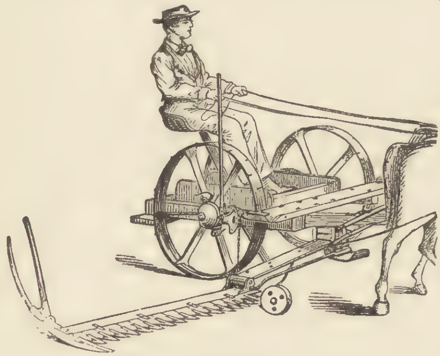


Fig. 1.—*Buckeye Mower Ready for Work.*

These points are all illustrated in the Premium Machines.

To the "Buckeye Mower," (ADRIANCE, PLATT & Co., New-York and Po'keepsie,) was awarded the Great Gold Medal. The accompanying cut, (fig. 1,) shows this machine ready for work, and in fig. 2, it is seen with the bar folded over, as driven from field to field. At the Syracuse Trial in 1857, the Buckeye also stood first ; and the principles then introduced in this machine, of a jointed bar and two driving wheels, have vindicated in the experience of intervening years, the verdict on their merit then pronounced.

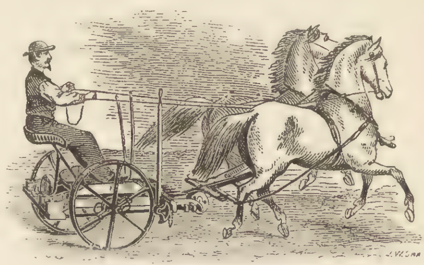


Fig. 2.—*Buckeye Mower with Folded Bar.*

To the Clipper Mowing Machine (Rhode Island Clipper Mowing Machine Co., Newport, R. I.,) was awarded the 2d prize of $25. And these two machines had a formidable rival in Wood's Mower (WALTER A. WOOD, Hoosick Falls.) As to their work in a meadow mainly of timothy grass, the Report of the Judges says : "Of these the stubble of the first

two (Buckeye and Clipper) was slightly the shortest, but for evenness and smoothness of cut, for adaptation to unevenness of surface, and to different kinds of bottom, of weeds and grasses, and to the admirable way in which the grass was left for drying,—the cutting of all these machines was nearly all that could be desired, and they were all marked by the judges with the number 40, which denoted perfection of work, and they were the only ones thus marked." As to the trial in clover, however, the mark given to the Buckeye was 40, while the Clipper was marked 32, and Wood's 29. The difference here seems to have had great weight in determining the award, although as the report itself says, there is some difficulty in understanding the inferiority of the two latter—" the construction and workmanship of these machines is such that they ought to make better work than they did. The Clipper, especially, has an excellent adjustment for rotating the finger bar so as to bring it to the very roots of the grass. But we have no right to go behind the record in making our decisions, and as the Buckeye is the only one which made perfect work in both fields, we are constrained to give the preference to the Buckeye, for *Quality of Work.*"

Thus one leading point (quality of work) was decided in favor of the Buckeye. The next under consideration is Ease of Draft. Here the Judges give the following figures:

Machine.	*Width of Swath.*	*Draught.*
Buckeye,.............	3 feet 9½ inches,........	180.56 pounds.
Clipper,.............	5 feet	199. do.
Wood's,.............	4 feet ⅝ inch,.........	186.74 do.

Thus the proportion of draught to *each inch* in width of swath, was 3.96 lbs. in the 1st machine, 3.31 lbs., in the 2d, and 3.83 lbs. in the 3d—a fact apparently not alluded to in the report, and which, if regarded as decisive, would have placed the Buckeye last in this particular. A second dynamometer trial was held, in which the machines cut with bars of equal length; and here a slight difference in favor of the Buckeye was observable, as it showed a draught of 227.13 lbs., against 236.22 for the Clipper and 257.62 lbs. for Wood's—a difference, it may be presumed, rather apparent than real, as the Report says: "Even here we cannot be absolutely certain, since the stubble was somewhat longer in the Buckeye's swath than it was in the Clipper's, and considerably longer than it was in Wood's, and the bar of the latter machine was new and rough." And the conclusion was reached that "neither of the machines had any very important advantage over the other" in respect of draught.

With regard to the third point, Durability, the Report enters into considerable detail as to the construction of the three Machines above named, again giving preference to the Buckeye, on the ground that it has greater strength to resist injuries from obstacles encountered in the field, such as stones or stumps; that its motion is less rapid than that of Wood's; that its wheels will bear better service than those of the Clipper, and that in the Buckeye "bevel gearing" is used for the "slower first motion," and

a more accurate "spur gearing" for the "second fast motion," which is not the case in the Clipper.

The fourth point, Side Draft, was in favor of the Buckeye, its test showing 2½ lbs., against 5 lbs. for the Clipper, and 6 lbs. for Wood's.

As to the other points, Simplicity of Construction, Portability, and Facility of Management, the Clipper has perhaps the advantage in the first, from the smaller number of its bolts ; the Buckeye in the second and third, from the fact that its cutter bar folds over horizontally, instead of standing vertically at the side of the frame. And the following conclusion is reached :

"It follows clearly from this, that the Buckeye excels in the greatest number of points. We may possibly err in our judgment on the question of durability, but in relation to the other points there can be no question whatever, and we therefore award the Gold Medal in the first class to Adriance, Platt & Co., for their Buckeye Mower, entry No. 10."

Other Leading Mowers.

So great prominence is given in the above abstract from the Committee's

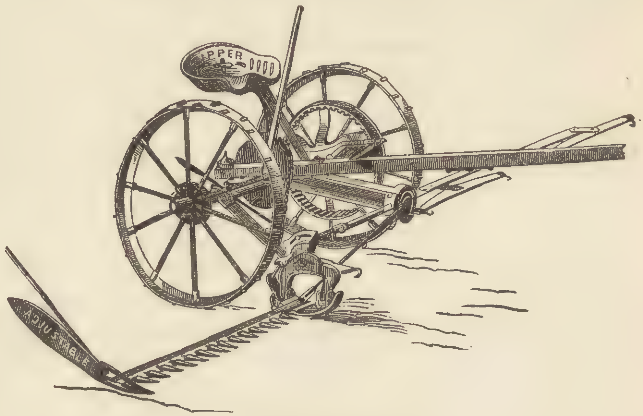


Fig. 3.—*Rhode Island Clipper Mower.*

statements, to the Buckeye Machine,—the excellence of which, indeed, has been proved by long experience in the hands of thousands of farmers—that we may venture some remarks of our own as to its competitors, several of which, though not successful on this occasion, certainly possess merits of the highest order.

The second prize, as already stated, was awarded to the Clipper Mower, a machine which evinces remarkable ingenuity in the inventor, combined with wonderful accuracy of mechanical construction. With the exception of the tongue, we believe it is entirely made of iron or steel, including foot-board, tool-box, seat, and everything else. By a peculiar arrangement, in

which the whiffletrees are attached, not to the pole, but to a rod running back to the front bar, the draft is an upward one, lessening the friction of the shoe on the ground, and the downward pressure caused by the working of the gear, and, as is claimed, reducing the force of any shock created by obstructions, as compared with machines in which the resistance is transmitted through all their working parts to reach the pole. The joint of the finger-bar, is so mathematically exact that it cannot bind or cramp with the connecting rods, in any position. By a simple, but very ingenious arrangement of the working parts, they are completely cased, and at the same time the number of bolts required is small, and includes but two sizes. There are many other features, such as the noiselessness of its operation, owing to mechanical perfection and nicety of finish in every detail, which we cannot allude to more at length; if farther experience in the field equals the anticipations now entertained, the "Rhode Island Clipper" will ere long obtain great popularity. It is manufactured in New-York by Messrs. R. H. ALLEN & Co.

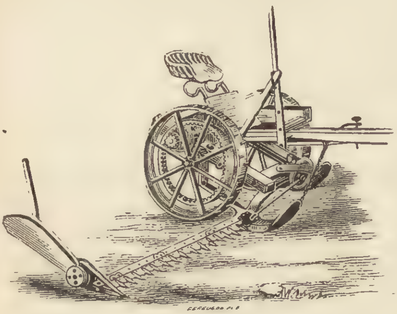


Fig. 4.—*Wood's Mower.*

The Mowing Machine of Walter A. Wood has achieved remarkable success in foreign trials, and is a general and deserved favorite both in this country and abroad.

The Kirby Machine, as manufactured by Messrs. D. M. OSBORNE & Co., Auburn, N. Y., has also had a very large sale, and is thoroughly established as an implement of great excellence. This (as well as the preceding) has been so long before the public, that we need not occupy any space with those details as to its construction, which would be appropriate if either was now for the first time offered to the public. As to the Kirby, however, which has one peculiarity, in its single wheel, not found in any of those above noticed, it is only fair to refer to the argument in its favor, based upon that fact; the manufacturers contend "that in mowing,

Fig. 5.—*Kirby Mower.*

no two-wheeled machine can work on as rough ground as the Kirby with its one wheel. For instance," they say, "the Kirby can run in a ditch while the bar runs on the bank and cuts; no two-wheeled machine can do this, nor can it run in dead furrows or water furrows, *nor wherever the form* of the land has a tendency to bring the machine into a similar position." They adduce other reasons, which need not be quoted, farther than to say that the machines made on this principle certainly seem to satisfy purchasers who have had them many years in use.

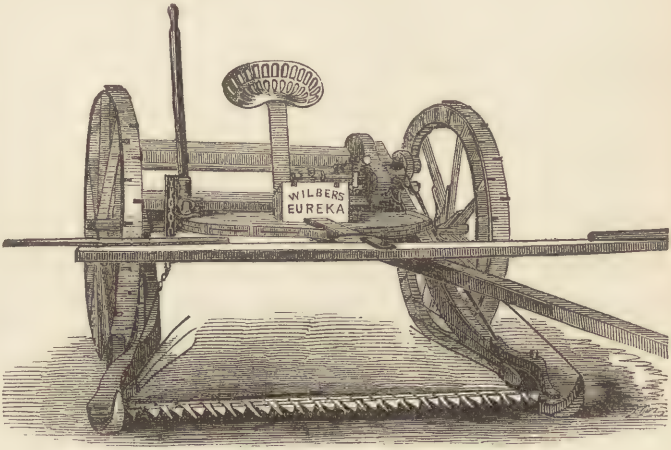


Fig. 6.—*The Eureka Mower.*

To another Mower, the Eureka, shown in fig. 6, we must refer very briefly, as perhaps the greatest novelty in its class, although, owing to defective construction or imperfect preparation for the Trial, it did not accomplish all that was expected. The horses go directly in front of the machine, instead of on the left, and by use of a wide whiffletree one of the horses walks outside the standing grass. The machine does not go around the field, but turns back on the side along which it begins—thus going in each direction against the grass walked over by one of the horses, and avoiding the necessity of walking both through the cut swaths, as is the case with other machines. The finger bar can be readily raised and is at all times before the driver.

Reaping Machines.

The Gold Medal in Class II, for Hand-Raking Reapers, was awarded to the Kirby, made by D. M. Osborne & Co., Auburn, an illustration of which appears in the advertisement of that firm on another page. The second prize went to the Cayuga Reaper of C. Wheeler, Auburn.

The Trial of Reapers offers less scope for remark than that of Mowers, for the reason that what has been already said of the latter will apply partially to the former, and because there were among the reapers fewer novelties to attract attention. In Class 2½, for Self-Rakers, there were five

competitors, and the Trial, with so large a number of different patents, was on the whole satisfactory and successful. The spectators on the ground appeared to be convinced that the increased weight and wages of an additional hand to clear the platform were unnecessary, and that Self-Rakers, in some of their forms, would become generally adopted. As they are mostly rather new, some time may elapse before they become durable in construction—we are informed that some of them are liable to become soon deranged. Time will determine.

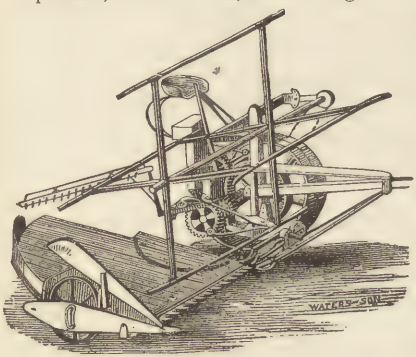


Fig. 7.—*The New-Yorker Self-Raking Reaping Machine.*

The machine made by Seymour, Morgan & Allen, Brockport, N. Y., (see fig. 7,) received the Gold Medal as having "a decided preponderance in the qualities which constitute a valuable Self-Raking Reaper — the only objection to it being its greatest draft, which is 56.9 lbs. in excess of Bradley's. This excess, in our opinion," says the report, "is due to its greater weight, which is 218 lbs. more than Bradley's, and therefore increases its surface draft. But as this greater weight is caused by greater provision to secure its durability, it is much more excusable than if the draft had been consumed by increased friction."

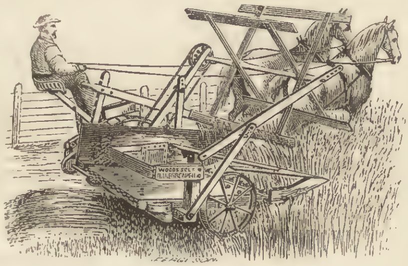


Fig. 8.—*Wood's Self-Raker.*

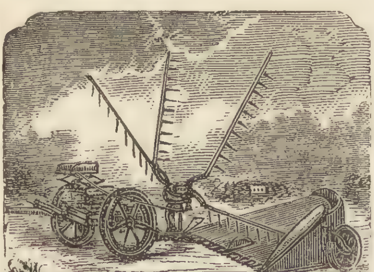


Fig. 9.—*The Syracuse Self-Raker.*

The second prize was awarded to C. C. Bradley & Son, Syracuse—a machine of which we have no engraving. Wood's Self-Raker was entered in this class, (fig. 8,) but did not equal the prize machines in the effectiveness of its rake attachment.

In Class III, however, Combined Mowers and Reapers as Hand Rakers, Wood's Machine was more

successful—taking the Gold Medal. And the second premium here was taken by E. F. Herrington, Valley Falls, on the Eagle Mower and Reaper.

In Class IV, the Gold Medal was taken by Messrs. Williams, Wallace & Co., who construct the Hubbard Reaper with the Syracuse Self-Raker, shown in fig. 9. The second honor in this class fell to Seymour, Morgan & Allen, Brockport, who had already received the Gold Medal in Class 2½. In Class V there was no award, and in Class VI—One Horse Mowers—the Gold Medal was won by R. L. Allen, New-York, on the One Horse Clipper, to which the commendation already given to the same machine of a larger size (pages 112 and 113) will fully apply. The second prize went to Messrs. D. M. Osborne & Co., Auburn.

Other Implements and Machines.

In Classes 9, 11, 12, 14, 15, 17, 18, 19, there were no awards owing to lack of competition. In the remaining divisions of the list, the following were the prizes given :

Class VII.—Horse Powers, Inclined Endless Chain—R. & M. Harder, Cobleskill, *Gold Medal.*

Class VIII.—Horse Power, Lever or Sweep.—Dow & Fowler, Fowlerville. *Gold Medal.*

Class X.—Two Horse Combined Threshers and Cleaners—R. &. M. Harder, Cobleskill, *Gold Medal.*

Class XIII.—Horse Rakes—Wanzer & Cromwell, Chicago, *Gold Medal.* 2d Premium—A. B. Sprout, Muncey, Penn., $25.

Discretionary.—H. N. Tracey—*For Wooden Sulky Revolving Horse Rake,* $25. P. S. Carver—*Wooden Revolving Horse Rake without Sulky*, $25.

Class XVI.—Horse Power Hay Forks—"Gladding's Long-Handled Self-Sustaining Horse Power Fork." J. L. Mansfield, Clockville, *Gold Medal.* 2d Premium—Chapman, Hawley & Co., Utica, $25.

Discretionary.—A. B. Sprout—*For Combined Hay Fork and Knife*, $25.

LABORERS' COTTAGES.

IN EACH of the published volumes of Rural Affairs we have given designs for laborers' cottages to be erected on farms for the occupancy of the hired men. After many years' trial we have found this mode of obtaining hired labor better in nearly every respect than hiring men and boarding them in the family. The occupant of a cottage has a wife who can do the work of preparing meals for him at very little cost, and for this reason we have always found that such men could board themselves at much less expense than their board could be hired elsewhere, or could be afforded in the farmer's family, where an increase of hired domestics becomes indispensable. Since the publication of those articles we have been gratified to learn that a large number of land-owners, who occupy their own farms, have adopted this mode for procuring the necessary force to work them. They thus procure steady men who are willing to continue for years in their employers' service ; and the farmers themselves and their families are relieved from the constant burden of boarding, lodging and affording room for a number of hired men. They will find another advantage. Farmers' daughters who are growing up, will be less induced to marry lawyers or clergymen or doctors or merchants or village mechanics, for the sake of getting rid of this constant drudgery, and of finding a residence where they can enjoy at least some degree of privacy.

FRUIT CULTURE AND HORTICULTURAL ITEMS.

Cultivation of Fruit Trees.—We find it necessary to repeat often the advice to keep the ground mellow and constantly cultivated about fruit trees and especially young or newly transplanted ones. It usually makes a difference of ten to one, in the growth of peach trees, and of five or six to one with apple trees—a matter of some little importance to us Yankees who are so eager for speedy results, and who can hardly wait to have trees grow, even under the most favorable circumstances. A recent letter from a friend in Ulster county, says:—"I saw yesterday a plain case of the effect of sod, and of cultivation, on pear trees. A standard and dwarf pear tree were planted in a large flower bed—and one of each a short distance in the sod. The cultivated trees, after five years, are as follows: The dwarf is *four* times the size of the other, and the standard *eighteen* times as large as the other standard."

It is a common opinion that trees do best set in spring instead of autumn—simply because the soil about the autumn set trees becomes hard and compact, while it is more fresh and mellow around the spring trees. Keep all alike well cultivated, and the autumn trees will succeed quite as well as the others.

Strawberry Culture.—No fruit has given higher and more uniform profits, all things considered, than the strawberry. A greater return has occasionally been received by the sale of Delaware and other fine grapes; but a large outlay has been required in these instances to place the vineyard under way. Our readers are well acquainted with the great success of J. Knox of Pittsburgh, and with the fact that should not be forgotten, that his success is largely owing to the excellent and thorough culture which he gives his plantations, and to the care, system and elaborate skill used in picking, assorting, and packing his fruit for market. We observed a few weeks since, in looking over a Pittsburgh paper containing a list of revenue tax-payers, that his revenue was marked over $12,000 for last year. This is doing well for a plantation of 50 acres. In a recent conversation with him on this subject, he stated that $8,000 of this sum were received from the sale of strawberries alone; and that, but for the unusual and severe frost early in the season, he would undoubtedly have received $15,000 for them. We have not known an instance where a strawberry plantation has been subjected to good management, including clean cultivation, and the prompt excision of runners, that has not afforded a handsome profit. Proximity to a good market is always desirable; but so tempting and delicious are the best grown strawberries that they will manufacture a market in almost any place. We have had occasion to examine a number of instances the past year where strawberries of the best varieties have been raised by the management just alluded to; and in these cases the sales have amounted to about $1,000 per acre. The cost of land culture, superintendence and marketing, were variously from $250 to $500 per acre—leaving a net profit of $500 to $750. This net return may doubtless be relied on in all cases for some years to come, if the business is managed with the best experience and skill, and city markets are selected. The inquiry may occur, "Why do not many rush into the business and overdo it?" The answer is, "Many actually do enter it, but so rare is the appreciation of the best management, that scarcely one in a hundred gives his plantation the attention it should receive, and as a consequence his receipts are moderate or less in amount."

Packing Strawberry Plants.—We have heard many complaints of heavy losses by the bad packing of strawberry plants to be sent long distances. We have seen plants that were packed in a wet state in tight boxes come out a mass of fermentation. A large strawberry grower, who had received several hundred dollars' worth of high priced plants, told us that not one in twenty survived the effects of bad packing. The Rural New-Yorker, in speaking of the excellent mode adopted by the Rochester nurserymen, says that Messrs. Frost & Co. of that city, have been quite successful in shipping strawberry plants, even as far as California, and through great changes of climate on the way, by first drying the moss

in which they are packed, thoroughly in green-houses, and then placing the plants in packages of one dozen each, mossing each package separately. The whole is then packed in tight boxes to exclude the air.

This is not unlike the mode adopted by those European nurserymen, who understand their business, in sending trees and plants to this country. We have always been most successful with evergreens, however, (which contain much water at all times,) by directing them to be packed in crates or large baskets, with the roots at the center and the stems radiating outwards. The crates are merely lined with open coarse mats, admitting the air. Packed in tight or nearly tight cases, they have usually fermented as perfectly dry moss could not be afforded for bedding them in, in sufficient quantities to absorb the heated vapors.

We have received strawberry plants in small quantities by mail, wrapped in oil-cloth, so as to form a perfectly water-tight case. They came apparently quite fresh, but proved to be fatally injured by the confined moisture. Had a sufficient quantity of dry moss been used, inside the oil-cloth wrapper, the result would doubtless have been quite different.

Cutting Grafts.—Those who expect to use quantities of grafts in spring may find it most convenient to cut them in December, and not be compelled to perform it hurriedly, with perhaps the omission of what they most want, just before using. Very severe winters sometimes injure the shoots, or when apparently uninjured, their vigor of growth is lessened, and they do not start so readily. This may prove the turning point between the growing and dying of a graft. Plums and pears are more apt to be thus afflicted. By cutting them early in winter, all danger of this kind is avoided.

When grafts are cut early in winter, they should be tied in moderate sized bundles, by means of a band of bass around each end and in the middle. The name should be written on a small strip of wood not over half an inch wide, which should be tied up with the grafts. As a precaution, they should be written on both sides. A common lead pencil may be used for this purpose, and if the wood is first moistened on the surface, or still better, rubbed very thinly with white paint, the name will be more durable. The natural moisture of the grafts should be exactly preserved the winter through; to effect which purpose they are most conveniently packed in boxes in the cellar. The best substance to pack them in is damp moss finely broken up or pulverized. If it cannot be obtained from swamps, the green moss from woods answers equally well. The grafts should be completely and compactly imbedded in this moss. If this cannot be obtained, slightly moist sawdust will answer, provided the boxes are small or holding not over a bushel, to prevent injury by heating. They should be occasionally examined to see if the proper degree of moisture is maintained. Moist sand will also answer the same purpose. Grafts may be also kept buried in the following manner: Place them in a box open at top, filling it till within a few inches of the top. Secure them here by cross-pieces; then dig a hole on a very dry spot of ground, invert the box and bury them. The natural moisture of the earth will keep them just right.

Orchard Caterpillar.—The vast number of these caterpillars in many parts of the country admonishes orchardists to destroy them before they make such progress again as they have the present year. Some apple trees have been entirely stripped of their leaves—not only rendering a crop impossible, but checking the growth of the tree at the most important period of the year, and rendering it liable to injury by winter, and retarding its vigor in future. It is not too soon, Aug. 1st, to commence the destruction of the eggs, which have been recently placed upon the young twigs. As they are usually on the projecting shoots near the outside of the tree, the practiced eye will quickly detect their presence, and a single clip of a pair of orchard shears, placed on the end of a pole, and worked with a cord, will bring them to the ground. This is much easier than the more laborious and more uncertain process of brushing, swabbing, winding, thrashing, pounding and crushing, after the caterpillars are half or wholly grown, for no individual escapes when the little ring of eggs is taken off entire. In the autumn, after the leaves have fallen, pass around again and clip out the remainder. By going through the orchard at least two or three times, there is less chance for any accidentally hidden rings to escape. A cloudy day should be selected,

so that the light may not dazzle or injure the eye; and after some practice, it is surprising with what quickness any one may detect these rings on the twigs, by a glance over the apple tree. Cherry, pear and other trees should be examined in the same way.

A careful attention to these instructions any time before the coming spring will completely clear orchards of this pest and the owner will have the satisfaction as he passes the trees, of seeing them full of healthy foliage, without the annoyance of witnessing these huge nests on denuded branches.

Evergreens from Woods.—Very few land owners plant out a sufficient number of evergreen trees. They furnish some important advantages. They beautify the winter landscape; and, what is quite as important to the utilitarian, they protect from the sweep of cold winds. The farmer who has his dwelling flanked on the most windy points, with a dense growth of handsome evergreens, is saved the yearly expense of $10 to $50, in firewood or anthracite. If his barnyard is well protected with evergreen belts, at least an equal amount is saved in hay and grain for his domestic animals. Nor is this all; intelligent cultivators have repeatedly asserted, that the increased value of their fruit trees and crops, resulting from protecting belts of trees, often reaches as high as fifty per cent. on the whole amount.

In some places evergreen trees may be most cheaply procured, by the hundred or thousand, from nurseries. But they may be as often obtained from the borders of woods or swamps. It is very common to lose trees thus procured—which is generally ascribed to *bad luck*, but it always results from bad management. We nave set out many hundreds of trees in this way, including White Pine, Hemlock, White Spruce, Balsam Fir, Arbor Vitæ, &c., and never lost a tree that was managed according to the instructions given. The work has been done in autumn, winter, and in the spring. There is but one leading and essential requisite; and that is, *to carry a mass of earth on the roots.* The instructions have been to take up a cake of earth large enough to hold the tree in an upright position, without upsetting when placed on the surface of the ground. The larger the tree, the larger, of course, must be the mass of earth.

Let every farmer add to his plantation, in this way, during winter. A few trees at a time will, after a while, give him plenty of protection. It will frequently be found convenient to do the work during the depth of winter. Young trees taken from along the borders of woods will be better and hardier than those from the center. The covering of snow and forest leaves often protects the soil, so as scarcely to freeze, or to form but a thin crust—just sufficient to hold the flat mass of earth together. A sharp spade easily cuts through this crust, and the trees thus lifted are easily slid, in a standing position, up an inclined plank, and placed on a sled. When large we have drawn them up by a horse, by means of a rope attached to the foot of the stem. If the ground is frozen hard where they are to stand, they may be set upright together, and the roots protected until spring by straw thrown over them.

Fire-Blight in the Pear.—Gen. Negley informed the writer during a recent visit at his residence, that a near neighbor had very successfully treated his pear trees, which had been struck with the fire-blight. He had at first adopted the common practice of cutting off the affected limbs as far down as the disease appeared to extend, and not, as this journal has so frequently recommended, amputating two or three feet below, or beyond the reach of the descending poison. The neighbor here alluded to, then changed his mode of operation, and as soon as he discovered the disease in possession of any of his trees, (which were some ten years old, and three inches in diameter,) he immediately cut them down to within a foot or two of the ground. The season being about midsummer, when the early summer growth had ceased, and when that severe check would not be given to them that would result if done when in rapid growth, they sent up new shoots the following spring, and every one thus treated has formed a fine healthy pyramid; while those managed in the old way nearly all perished.

The Best Grapes.—The Fruit Growers' Society of Western New-York ballotted for the best varieties of hardy grapes, and out of thirty-one votes, the following were the only ones that had more than ten—those receiving the greatest number standing first in order: Delaware, Diana, Isabella, Hartford Prolific, Concord, Creveling.

NOTES FOR THE GRAZIER AND BREEDER.

The Cattle Plague.—The symptoms have been thus clearly described by the veterinary committee of the Royal Agricultural Society: "The early symptoms of the plague are usually a remarkably dull and dispirited condition of the animal, which will stand with its head hanging down, ears drawn back, and coat staring, refusing all food, and occasionally shivering. The eyes have an unusual expression of anxiety, and a mucous discharge flows from them, and also from the nostrils. The skin is hot, but sometimes chilly; the temperature varying from time to time. The extremities are cold; the breathing short and quick, and frequently accompanied with moaning as an indication of pain. The inner part of the upper lip and the roof of the mouth is reddened, and often covered with raw-looking spots. The bowels are occasionally constipated; but, in most instances, diarrhea soon sets in, the evacuations being slimy and very frequently of a dirty-yellow color. The vagina is often intensely reddened. The prostration of strength is great, the animal staggering when made to move. In milch cows the secretion of milk is rapidly diminished, and soon ceases altogether."

Pleuro-Pneumonia.—The attack is mostly insidious, the animal appearing at the outset to be but little affected. The eyes retain their brightness, often to the termination of the illness. The appetite is generally diminished, but rarely lost, except in the advanced stages of the disease. A short, dry, husky cough is one of the earliest symptoms; it continues throughout, and is easily excited by moving the animal, especially if such movement is sudden. There is rarely any discharge from either the eyes or the nostrils. The breathing is greatly increased, and becomes painful as the disease advances. A dull sound is emitted on gently percussing the side of the chest over the diseased lung. Firm pressure applied to this part will also cause the animal to shrink. There is little or no alteration in the fæcal evacuations, excepting in the last stages of the malady, when a diarrhea comes on. The warmth of the body and the extremities is often retained to the last hours of the illness. In milch cows the quantity is lessened; but the animal will frequently yield a fair quantity to the very last. The affected animal will sometimes live for weeks.

Gestation of Cows.—According to Earl Spencer's table, published in an early number of the Royal Agricultural Society's Journal and in "Doyle's Cyclopædia of Husbandry," the time of gestation in the cow varies in length from 220 to 313 days. Calves born at the earlier period of course come into the world prematurely. The natural term of gestation, according to different calculations, is from 280 to 285 days. In most parts of the north of England a cow is considered "due" at the end of forty weeks, or 280 days; but some published tables allow from three to five days beyond that time.

Constituents of Feeding Materials.—From the following statement, some general idea may be obtained of the proportionate value of various Feeding Materials:

	Parts in 100.		
	Real food.	Water.	Ash.
Beans, ...	82½	14	3½
Peas, ...	80	16	3½
Oil Cake, ...	75½	17	7½
Swedes,... ..	14	85	1
Turnips, ...	10	89	1
Mangolds, ...	10	89	1
Carrots,.......	12	87	1
Common Hay,.	76½	16	7½

One Pound of Flesh—It is said, will be produced under favorable circumstances, by the consumption of

Turnips,...	100 lbs.	Milk, ...	25 lbs.
Potatoes, ..	50	Oat meal, ...	9
Peas,......	3½	Flour, ...	7½
Beans, ...	4	Barley meal,.	7

Short-Horns.—An Illinois writer comments on their last State Fair as illustrating the direction in which Illinois stock-raisers are breeding. "The docility, early maturity, symmetry and excellent grazing qualities of the Short-Horns is fast driving from the State the other distinct breeds of cattle. Individuals, for specific purposes and localities in the State, may prefer and rear other breeds; but the ruling family, both for breeding pure and crossing on native stock, is the Short-Horn."

ITEMS IN DOMESTIC ECONOMY.

Creaking Hinges.—Doors hung on butt hinges often make an unpleasant noise by creaking. The best way to prevent it is to place a drop or two of kerosene, by means of a feather, on the top of the bolt connecting the two parts, as well as at the sides, working the door backward and forward at the same time. The oil will run down and the difficulty will cease.

Door Latches.—Nothing wears out the doors of a house faster than slamming or rattling against latches that do not catch. They should be at once repaired, and latches and bolts which do not slide easily may be made to do so if touched with a drop of oil. It is well to pass around once a week with an oiled feather, and touch every latch and bolt in the house.

Ventilation.—Those who occupy or work in close rooms often suffer in health for want of fresh air. Apartments not supplied with ventilators should have the windows so constructed as to let down one, two or three inches from the top. This will let in a moderate and steady current, which will become well mixed with the other air before it reaches the floor, and be more pleasant than sweeping gusts near the feet through windows raised from below.

Levelling Clocks.—Clocks often run badly by not being set level—ticking unequally and stopping easily. They may be wedged up so as to be perfectly level, and an accurate ear will know by the ticking when this is affected. But a more perfect way is to tack a card or paper behind the pendulum in the evening, and place a bright lamp at a distance exactly in front. Then mark with a pencil the shadow of the rod, move it very slowly to one side until it ticks, and then make another mark. Move it to the other side and mark it when it ticks again. Measuring the distance of these three marks will enable the operator to level the clock to a hair's breadth.

Thermometers. — Every house should be supplied with several thermometers. Apples will keep better in a cellar with a low temperature, which may be maintained if one or two thermometers are always at hand to indicate the approach of freezing. They are always of use in dairy and other apartments.

Windows should always slide easily, and without rattling. Glass is often broken by attempting to raise those which move with difficulty; and no one admires the cold currents and music of those which are constantly rattling. A little time employed occasionally in making them right is an economical expenditure.

Matches should always be kept in a match safe. It is neither neat nor secure to leave them scattered on bureaus and stands. Every good tin shop supplies the article, but if nothing better can be had, empty mustard boxes with smooth-fitting lids will answer.

Lamp-Lighters.—These may be easily made by tearing waste paper into strips an inch wide, and rolling these strips neatly, by beginning at the upper corner and rolling nearly but not quite parallel with the side of the strip. When completed, bend up and pinch the lower end, to prevent unrolling. A little practice will give them a very neat appearance. If desired, they may be made long enough to run down the chimney of a kerosene lamp.

Baskets should never have any wet substances placed in them, such as appple parings, or anything that will wet and decay the splints and spoil their appearance.

Waste Twine should be neatly wound into balls and kept for future use and not thrown into drawers in a tangled mass. This will save time when one is in a hurry, and impart habits of neatness.

Paste for Ready Use.—Mucilage made of gum arabic is good for many purposes, but rather costly. A cheaper kind, and better adapted for pasting unsized paper is made of gum tragacanth. A few cents worth may be procured at a druggist, and will last years. Place a stratum of the gum half an inch thick in the bottom of the bottle and fill it two-thirds with rain water. In a few hours it will be ready for use, and will last several weeks in hot weather without injury.

Tables without castors should always be carefully lifted from one place to another.

Nothing destroys a table more rapidly than shoving it on its legs across a floor.

Paint.—It is always convenient to have paint at hand for doing small jobs. If kept in common paint pots, it soon dries. An empty fruit jar with a close fitting cork answers an excellent purpose; and if the handle of the brush is short, so as to go inside, it is always ready without washing. Putty always ready for use may be kept in the same way.

Cucumber Pickles.—Cut the cucumbers from the vine by means of scissors or a knife, so as not to tear the end, as would be the case if merely plucked by hand. Wash them in cold water, and then merely plucked by hand. Wash them in cold water, and then lay them in the bottom of a barrel or jar, into which a layer of salt has been previously deposited, so that when successessive layers of cucumbers and salt are made, the former will be imbedded in salt, the moisture which covers them tending to dissolve the salt and convert it to brine. They may remain a long time in this condition—many keep them thus until sold in market. To finish the pickling process, take a quantity of good vinegar, but not too sharp or it will destroy the texture of the cucumbers, and give it the flavor of spices, by placing equal quantities of cloves, red and black pepper in a bag so as to give about half a teacupful of this mixture to a gallon of vinegar, both to be boiled together. Then, having previously removed the pickles from the salt, and soaked them about eight or nine days in fresh water, changing the water each day; pour the hot vinegar, spices, pepper, bag and all, over the cucumbers, and in two weeks they will be ready for use. Some who make very sharp pickles pour off the first vinegar, and make a second addition, keeping the first liquor for the next batch.

Another recipe is as follows:

Cut the cumbers from the vines, wash them in cold water, and place them in an earthen jar. Put salt enough to make a strong brine into boiling water and pour on them; repeat this three successive mornings, and the fourth cover them with cold vinegar, adding a small quantity of mustard seed to prevent moulding. They will keep the whole year.

Elderberry Wine.—To ever quart of berries add one quart of water; boil half an hour; run the liquor and break the berries through a hair seive; then to every quart of juice add three-quarters of a pound of sugar; boil again one-quarter of an hour, with Jamaica peppers, ginger, and a few cloves; when sufficiently cool, pour into a barrel a cup of yeast and a piece of toast to assist the fermentation—(to be kept in a warm place.) When it ceases to hiss, add one quart of brandy to eight gallons of the liquor; then close the barrel perfectly air-tight, and keep in a cool place for six months, when it will be fit to bottle.

Blackberry Wine.—Gather when ripe, on a dry day. Put into a vessel with the head out, and a faucet fitted near the bottom;, pour on them boiling water to cover them. Mash the berries with your hands, and let them stand covered till the pulp rises to the top and forms a crust in three or four days. Then draw off the fluid into another vessel, and to every gallon of liquid add four pounds of sugar; mix well and put into a cask to ferment for eight or ten days, and throw off any remaining lees, keeping the cask well filled, particularly at the commencement. When the fermentation has ceased, bung it tight; after six or twelve months it may be drawn off and bottled.

Variation.—"To one bushel of blackberries put one gallon of water. Let the compound stand for 24 hours, at the end of which, mash and strain the blackberries. To every gallon of the juice put three pounds of sugar; set this to ferment, which it will do in about fifteen days, more or less, according to the temperature of the weather. Bottle up and keep for use."

Grape Wine.—Bruise the grapes, which should be quite ripe. To each gallon of grapes put a gallon of water, and let the whole remain a week without stirring. Then draw off the liquor carefully, and to each gallon add three pounds of white sugar. Let it ferment in a temperate situation; when fermented, stop it up tight. In the course of 5 months it will be fit to bottle.

Keeping Hams.—We have found it a good method in keeping hams and shoulders, to let them hang in the smoke-house, or a tight, dark room, and give a few hours smoking every week or ten days. This will keep out flies and bugs, and keep the meat free from damp and mould.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.

ROTATION OF CROPS.

THE ROTATION OF CROPS has one great advantage over all other agencies in conducting farm operations. It accomplishes by thought alone, that which in other directions requires heavy expenditures or hard labor. Manuring is the great prime mover; rotation the guide of this moving force. The former may be compared to the engine which propels the vessel; the latter the rudder which directs all the exerted power to a beneficial end.

With a few exceptions, the most successful husbandry is that which includes a mixture or combination of the different departments. Domestic animals assist in the manufacture of manure. Hay and grass, grain and roots furnish their food. The straw serves as a sponge to hold the otherwise wasting manure, yielded by these animals. Thus the one becomes a means of increasing the other; animals enrich the soil and increase the crops; this increase of crops again supports an increased number of animals, and a mutual augmentation takes place.

The continued cultivation of the same land with the same or similar crops, is attended with a constant exhaustion or running down of the soil. A crop of wheat, or of oats, or of corn, raised year after year on the same piece of ground, yields less each successive year, till little or noth-

ing is finally produced. (Fig 2.) The soil deteriorates in every part, meadows run out, and moss and weeds come in. Tillage grounds wear away in fertility, till they fail to produce materials for making manure. The exceptions are where enriching or non-exhausting crops are raised,

1860. 1861. 1862. 1863. 1864.

Fig. 2.—*Successive diminution of Corn, grown continuously on the same Ground.*

or where heavy manuring is constantly resorted to ; as in the case of permanent pastures in dairy regions, which are regularly top-dressed ; or the market gardens near cities, kept enriched by heavy manuring.

There are several advantages in adopting a rotation. One is the preservation of the fertility of the soil ; a second is, checking the spread of weeds ; and a third, is an even distribution of labor throughout the season.

I. Preservation of Fertility.

Farmers are sometimes driven as they suppose, in cases of necessity, to crop hard to raise money to pay their debts. But in thus endeavoring to get a little increased interest on their capital, they are making a most formidable draft on the principal. An additional amount of information and planning and proper arrangement,—would preserve the fertility of the land, and the crops would soon be increased more than by hundreds of dollars worth of labor without. Where experiments have been made with different courses of crops—some of them bringing wheat often into the course and other cash-producing but soil-exhausting crops ; and others with such crops at greater intervals—the increased richness of the land in the latter cases has been attended with the greatest profit at the end. A crop of forty bushels of wheat from an acre, once in four years, is far better than twenty bushels once in two years, for then, three years of intervening crops in the former, instead of two only in the latter case, are afforded for other crops, which may be much heavier besides. Hence those of the same kind, occurring at remote intervals, prove most profitable, even though for some of the intervening crops there may be little demand in market. Take as example, the results of a bad and of a good course, which on many soils would not be far different from the following :

I. A hard-cropping course—one acre :

1st year—Wheat, 20 bushels,	....	$40..00
2d do — do 10 do	....	20..00
3d do —Oats, 25 do	....	12..50
4th do —Wheat, 8 do	....	16..00
		$88..50

The land diminished in value.

II. A better rotation—one acre :

1st year—Wheat, 20 bushels,	....	$40..00
2d do —Clover and grass, 1½ tons,	....	18..00
3d do — do do 1½ do	....	18.00
4th do —Corn, 40 bushels,	....	30..00
		$106..00

A difference of $17.50. The land not diminished in value.

1. An important principle is—*all plants during growth, exhaust the soil more or less.* They derive while growing, a part of their support through the roots, and a part from the atmosphere through the leaves. Hence by removing the plants, a part of the constituents of the soil is removed ; but if suffered to remain by plowing under or by returning from the barn-yard in the shape of manure, they serve to enrich the land.

2. Another principle is, *that plants at different periods of their growth, exhaust the soil unequally.* As a general rule, they impoverish the soil but little during early growth or while in a green state, but they make a heavy draft upon it, while ripening their seeds. Hence, pasture which is consumed while young and green, injures the soil less than hay, especially if the latter is cut after the seeds are ripe ; corn sown for fodder, exhausts but little, but the exhaustion is greater when it furnishes a crop of ripened grain ; flax, though usually a severe crop, is far less so if removed while in a green and growing state.

3. *Different plants do not exhaust in the same manner nor in an equal degree.* Some plants take more of certain ingredients from the soil than others. Different plants also feed from different depths. The roots of some of the grasses for example, extend downward but a few inches ; while red clover often reaches a depth of two or three feet. While, therefore, one obtains nourishment from near the surface, another finds its supply down in the subsoil. This consideration, however, is of minor importance in arranging a rotation, as most plants throw down roots as far as good cultivation extends. Broad-leaved plants generally derive more from the air and less from the soil than those with narrow leaves ; hence, when buried as manure, they restore most largely to the soil.

4. *Some plants admit of a heavier application of manure than others.* Such are generally broad-leaved succulent plants, as beets, turnips and corn ; and, indeed, most plants whose value depends mainly on the quantity of green growth, as grasses for meadow and pasture. But the smaller grain crops, as wheat, oats and barley, may be so heavily manured as to promote too luxuriant a growth of leaf and stalk, at the expense of the seed. Hence, in a rotation, the manure should be given to such as are most immediately benefitted by a heavy application. The delay in time

and subsequent intermixture by tillage, gradually fit it for the more delicate crops. The manure should be always applied as soon as possible after breaking up from grass, that thorough admixture may take place before seeding down. This intermixture is of much more consequence than most are aware of; for by leaving fresh manure in lumps, unpulverized and unmixed, plants not only derive little comparative benefit from it, but by aiding in drying the soil in times of drouth, it has actually lessened, instead of increased, the products of the land.

Many other rules growing out of the preceding principles, will suggest themselves to the reflecting cultivator. From these principles, it will be perceived that *Farming is a continued system of exhaustion and return*, where properly managed; and not a continued system of exhaustion only, as when badly conducted; or, rather, exhaustion without any system whatever. The best way of making most effectually this return, should in all cases whatever, be considered the great leading object in all rotations, and the immediate profit from sales, the second great object. And, hence, in all good husbandry, the crop which gives the greatest immediate return in money, is not always the most profitable; but the one which puts the soil in the best condition, and helps to make the most permanently enriching manure, must be properly appreciated. The one may draw the treasure out of the soil, but the other accumulates it; the one expends the wealth of the land, the other collects it. If, for instance, a crop of green herbage be turned beneath the soil, though yielding of itself no return whatever, yet if it increases the following crop of corn from thirty to fifty bushels the acre, and a subsequent crop of wheat from fifteen to twenty-five bushels, it becomes, in reality, equal in nett value to twenty bushels of corn and ten of wheat.

II. Checking the Spread of Weeds.

As a general rule, naked fallows are the most efficient means of destroying weeds. Canada thistles and other plants which spread by the roots, may be killed in a single season on a clean fallow, where they are kept constantly turned under. Hoed crops if closely attended to and kept clean throughout the season, answer the same purpose with some other weeds. Other crops, as buckwheat, corn sown in thick drills for fodder, and a heavy growth of clover, serve as *smothering crops*, and greatly lessen the amount, if they do not wholly destroy weeds. *Some plants favor the growth of certain weeds more than others.* Cockle and chess flourish with wheat, alyssum with flax, and most sown crops are attended with an increase of grasses. These weeds multiply greatly where a single crop is raised on the same lands for many years successively; but rotation prevents this evil and thwarts their increase. The same remarks will apply, in some degree, to certain destructive insects, as for instance, the grub and the wire-worm.

III. Distribution of Labor.

The farmer who obtains labor at low wages does not always obtain it most cheaply. By a bad management of his succession of crops, he may be excessively crowded at one time and have little to do at another. An equal distribution throughout the season, therefore, becomes an important object,—enabling him to do everything in season, to do it well, and keep his farm hands at all times fully engaged. A rotation proper for one district of country, may be unfitted to another possessing a different soil, climate and market; and discretion must be employed by each land owner, to secure the best system. He should therefore, observe the leading objects:

1. To avoid exhausting the soil.
2. To return as much manure as possible.
3. To prepare for future crops.
4. To prevent the growth of weeds.
5. To distribute the labor equally.
6. To modify his rotation to existing circumstances; as, where labor is scarce and land plenty, to stock heavily with cattle; or where land is scarce, and labor and manure abundant, to make the raising of crops the principal business.

To assist further in planning a rotation, cultivated plants have been classified under separate heads; as for example:

1. Enriching crops, including all such as are plowed under for manure.
2. Non-exhausting, as pasture, peas, beans, and all grains cut before ripe, such as corn sown for fodder and green oats.
3. Exhausting, as ripened grain, turnips and potatoes.
4. Very exhausting, as flax, tobacco and hops. The more frequently the first named enter the rotation, the better will the fertility of the soil be kept up. A similar result will be secured where returning manure to the soil is a prominent object, and hence the raising of grain and roots may be made renovating instead of exhausting crops.

Having laid down the leading principles, it remains for us to give a few examples of practice. All farming may be regarded as some kind of rotation; either regular or irregular, however imperfect it may be, unless there is a perpetual succession of the same crop. There are all grades from the worst and rudest to the complete well-digested system. Among bad examples, prevailing to a greater or less extent in many parts of the country, the following were given many years ago in the Farmers' Register. Specimens of the two-course system were:

1st year—Corn.

2d year—Wheat, or oats if on land too poor or light for wheat. After harvest, the stubble grazed closely until next spring, when plowed again for corn.

When too poor to bear any small grain crops, that part of the course

is omitted on such poorer spots of the field, and afterwards on all; thus changing the relation to,

1st year—Corn.

2d year—Natural growth of weeds, grazed.

When not grazed the second year, as was sometimes the case, for want of separate fencing or some other cause, this rotation made a nearer approach to alternate and improving husbandry. It was then,

1st year—Corn.

2d year—Weeds not grazed, forming a very poor manuring crop.

An improvement was made on this by the adoption of the three-course system:

1st year—Corn.

2d year—Wheat, and afterwards the spontaneous growth of grass and weeds, grazed.

3d year—Pasture, closely grazed.

This was supposed to be a great march in agricultural improvement, and by some regarded as the summit of perfection, to which two-course and no-course cultivators aspired as the height of their ambition. The exhaustion of the second year was moderated on the poorer parts, by the wheat being then omitted, for the simple and very obvious reason that it would not grow there. On those parts there were, of course, two years of rest from tillage, in the three. Col. Taylor introduced a four-course system, which was as follows:

1st year—Corn.

2d year—Wheat and clover sown—or if too poor for wheat, left at rest and not grazed.

3d year—Clover, (and weeds,) not mown nor grazed.

4th year—Clover, not mown nor grazed. This course possessed the advantage of giving two and a half years, out of four, for vegetables to grow which were to die and decay on the soil, and finally to be plowed in. It was a great improvement on the others. But it was materially opposed to the principles of good husbandry in several respects. It furnished vegetable manure only. A large portion of the value of this was lost, by dissipation into the air during its decay. The returns from the land were necessarily small, as only two years out of four produced crops for harvesting. And it greatly increased the labors of tillage, by the increase of noxious weeds. It happens in the preceding specimens, that the longer courses are better than the short ones, but the mistake must not be made of supposing that the number in any course is the index of its excellence. A good two-course system may be devised which shall be better than a bad eight-course system. For example, an alternation of wheat and clover with the application of manure, and especially if the clover continue two years to be plowed in, would be far better than another course, consisting of wheat, corn, barley, oats, wheat, oats, without manure or seeding,

which would be eminently exhausting, all these belonging to the class of exhausting crops already mentioned.

We now proceed to give a few examples of good rotations, which may be adopted or varied according to circumstances. An excellent farmer in a wheat growing region pursued the following for twenty years, the chief part of his farm being regularly laid out in ten acre lots for this purpose:

1st year—Wheat after clover.

2d do.—Corn, potatoes and ruta bagas, with all the manure.

3d do.—Barley.

4th do.—Wheat, sown with clover.

5th do.—Clover, pastured. A portion of the farm consisting of low wet ground, was kept in permanent meadow, being occasionally top-dressed and rarely broken up and reseeded. Another part, too rough to be brought into the regular course, was subjected to summer fallow, and occupied with wheat, clover and grass for pasture. This farm invariably afforded heavy crops, and so clear had the soil become, that the amount of hard labor required for dressing the hoed crops, was not one-third that usually expended. The only objection to this course, is the frequent occurrence of the wheat crop, which would be removed by suffering the clover and grass to remain two or more years, instead of one. This change would likewise admit a greater number of domestic animals, and a consequent increase of manure—the whole occupying seven instead of five fields. The following course is adapted to eight fields:

1st year—Wheat with clover seed.

2d do.—Pasture.

3d do.—Meadow.

4th do.—Fallow.

5th do.—Wheat.

6th do.—Oats and barley with clover seed.

7th do.—Pasture.

8th do.—Corn and roots with manure.

Thus if each field contained ten acres, there would be each year twenty acres of wheat, twenty in pasture, ten in meadow, ten in summer fallow, ten in oats and barley, and ten in corn and roots. The chief objection is, that as there are only ten acres of meadow, there would be hardly enough dry fodder for the domestic animals supported by the twenty acres of pasture, besides stubble and summer fallow; more especially in our long winters, where for nearly six months green food cannot be had. A large quantity of roots would of course lessen the difficulty; and a permanent wet meadow, or a crop of corn sown as fodder, would obviate it. With a more southern region the objection would not exist.

A fine example of the benefit of rotation was furnished some years ago by an old, practical, hard-working farmer in Pennsylvania. He commenced business as a day laborer, and when thirty years of age, by the avails of his industry added to a small legacy, was enabled to purchase

and to pay for in part, a farm of 130 acres, 100 being under cultivation, but in a very low condition. When he commenced farming he adopted a a particular system of rotation, to which he has adhered for forty years, and his success was the best comment on the value of his experiment, he being then worth at least $100,000, notwithstanding several pecuniary losses he has at various times sustained.

The following simple three and four course systems may be adopted in grain growing districts :

Three-course system :

1st year—Corn and roots, well manured.

2d year—Wheat.

3d year—Clover one or more years, according to fertility and amount of manure at hand. Early corn should be planted to admit of early removal for sowing the wheat.

Four-course system :

1st year—Corn and roots with all the manure.

2d year—Barley, or peas, or both.

3d year—Wheat.

4th year—Clover, one or more years.

Oats is a severe crop any where in a rotation ; but may be admitted on strong soils, the 2d year, if followed with fine manure. An experienced farmer who adopts the preceding three-course system, never permits oats to grow on land fit for wheat, but confines the crop exclusively to the more moist parts of his farm, otherwise devoted to meadow and pasture.

The following course occupies nine fields :

1st year—Corn and roots with all the manure.

2d year—Barley.

3d year—Wheat seeded with clover.

4th year—Pasture.

5th year—Meadow.

6th year—Fallow.

7th year—Wheat.

8th year—Oats or barley with clover.

9th year—Pasture or meadow.

A rotation used by some good farmers in Maryland, is this :

1st year—Corn with manure.

2d year—Oats with 150 pounds of guano, and buckwheat turned under as manure.

3d year—Wheat, clover and timothy.

4th year—Meadow.

5th year—Pasture.

6th year—Buckwheat, root crops and peas.

The rotation below is well adapted to stony soils when the dairy is a prominent business :

1st year—After fall plowing, sow in spring to oats.

2d year—After fall plowing, plant corn in spring, applying a compost of muck, manure and ashes, and top-dressing with plaster.

3d year—After fall plowing sow early in spring to wheat, barley, or a thinly seeded crop of oats, seeding down to clover and timothy, and top-dressing with one bushel of plaster to the acre.

4th—Let the land lie in grass as long as it produces well, with the help of plaster and a triennial dressing in autumn.

The following course is used where little else than the dairy is depended on for profit, the wheat or flour being purchased :

1st year—Corn or sward with manure from barn-yard, (applied and spread in autumn or during winter,) and one bushel of plaster to the acre, putting the old or composted manure and plaster in the hills.

2d year—Sow barley, spring wheat or a thinly seeded crop of oats, with timothy and clover.

3d—Pasture or mow five or six years, and top-dress with manure in autumn. The grass seed should be sown at the rate of about half a bushel per acre, that the pasture may be fine and rich like old fields.

The following diagram exhibits to such as may not be familiar with the subject, the manner of laying out a farm with fields, each being alloted to its regular course, with the following rotation in each field for the six years : Wheat, corn and roots, barley, wheat, clover, grass :

No. 1.	No. 2.	No. 3.
1865—Wheat. 1866—Corn and roots. 1867—Barley. 1868—Wheat. 1869—Clover. 1870—Grass.	1865—Corn and roots. 1866—Barley. 1867—Wheat. 1868—Clover. 1869—Grass. 1870—Wheat.	1865—Barley. 1866—Wheat. 1867—Clover. 1868—Grass. 1869—Wheat. 1870—Corn and roots.
LANE WITH GATE TO EACH FIELD		
No. 6.	**No. 5.**	**No. 4.**
1865—Grass. 1866—Wheat. 1867—Corn and roots. 1868—Barley. 1869—Wheat. 1870—Clover.	1865—Clover. 1866—Grass. 1867—Wheat. 1868—Corn and roots. 1869—Barley. 1870—Wheat.	1865—Wheat. 1866—Clover. 1867—Grass. 1868—Wheat. 1869—Corn and roots. 1870—Barley.

CULTURE OF SMALL FRUITS ON THE HUDSON.

By Prof. T. H. Burgess, of Highland, Ulster Co.

TO A PASSENGER on one of the evening boats that ply on the Hudson in June, the taking aboard of numerous peculiar boxes, often several hundred at some of the landings, is a note-worthy item. True, the ease of the sofa, and the politics of the saloon, or the twilight glory of the river scenery, may be sufficient excuse for not prying into the mystery of these boxes piled on deck; indeed the boxes themselves seem to forbid such "prying," each being secured by a small padlock, one key of which is in the vest pocket of the owner on shore, (or perchance standing at your elbow;) the other is in the desk of the consignee in the city. "Captain," you may inquire, "what are those boxes?" "Those are berries," would probably be the reply. Leaving them to pass on to the great city, to be distributed about four or five o'clock next morning, by the cartmen to the commission agents, and find their way to the corner groceries, and before the day is done, to be "smothered in cream," and refresh the inner man of thousands—get ashore, if you feel inclined, recognize an old friend, and spend a day among the "berry men." Mount on top of a load of empty boxes, which has been selected from the heterogeneous pile thrown off with no especial care by the boatmen, and you will soon reach a comfortable home, hidden away among the hills and the trees, and will be awakened by the robins next morning, which also are interested in fruit, although they may not listen to a talk on the *modus operandi* of fruit culture.

Half an hour before the arrival of the boat, the "berry men" drive

down to the river, each with a spring wagon load of boxes or chests, which hold from fifty to one hundred baskets of fruit, (or from a half bushel to one bushel,) apiece. A bill of each day's shipment is handed to the agent for the boat, and a duplicate is sent in one of the fruit chests, (marked "bill," on the cover) to the consignee, who pays freight and cartage, and can tell whether all consigned has reached him, by means of these bills. On the outside of the chests, as well as inside of the covers, the number of baskets, cups or pints, is marked, to save further counting, and when the grocery-men or consumers bring back the empty chests, they are returned as promptly as possible to the owners.

There is, however, much complaint among the berry men, on account of the loss of chests frequently occurring; sometimes the cartmen get them on the wrong boat; sometimes the boatmen make mistakes and leave at one landing chests belonging both sides of the river from Cornwall to Tivoli; sometimes they are not returned by the consumers to the commission agent. Generally the owners charge the amount of lost chests to the commission agent, and we have known some who did *charge*, them again with taking the amount out of next years' consignments. By careful account keeping with the chests, having them all numbered, and by comparison with the books of the agent, it may be ascertained who is the responsible party. Losses in this way sometimes have amounted to 30, 50 and even 80 dollars, in a single season.

Those agents who take care to return chests promptly, and contrive to keep their customers posted on each day's sales, either by mail or by a card sent in the empty chests, soon find their business improving. Berry men will prefer those agents who get the best prices, and *keep them posted.* At the close of the season the account is settled; ten per cent. commission is charged on gross sales; freight and cartage usually amounts to about five per cent. more; the remainder is the share of the grower. This tithe of the commission dealers seems an unnecessary burden on the consumers, who ought to have the fruit a penny a basket cheaper, but there appears no better way practicable to either grower or consumer; indeed, it may be the very best plan for both, to have the produce thus pass through the hands of wholesale dealers, securing the best market for the one, and better and more certain supply to the other.

The necessary fixtures for growing small fruits, are good plows, a subsoil plow, cultivator, horse hoe, spading forks, narrow steel hoes, trowels for transplanting, and pruning shears, &c. A Packing House must be provided—either a room in some other building, a cheap shed in the field provided with shelves for holding the cups of fruit brought in by the pickers, and room for storing chests, &c.; but it is usual to have a substantial building, sometimes arranged also for grape packing and storage, and with a cellar for packing plants, and preserving vines and cuttings.*

* The engraving at the head of this article represents the packing house of O. J. Tillson, of Highland, a skillful cultivator and marketer of small fruits at that place.

To each acre of strawberries if well cultivated, 5,000 cups or baskets will be required, with chests to pack them in, and often an extra supply will be needed, in case a warm day follows a shower, ripening the berries with unusual rapidity. The cost of these articles is approximately as follows :

Utensils more than for usual farming,	$25.00
Packing House, from 15 to 500 dollars, say,	250.00
Cups or baskets, for each acre,	100.00
Chests,	70.00
Currant and cherry boxes,	15.00

But these are permanent investments and will answer for cultivating and marketing every variety of small fruit. Chests can be made cheaply during winter. Sometimes heavy lath are used for the sides, fastening the covers with screws or keys ; some make them of slats planed and painted, and bound with iron, and put the covers on with hinges ; others prefer tight chests, painted and marked with number, name and residence. The hinges are put on the *outside*, so that opening and throwing back the covers, will not break them. Fig. 5.

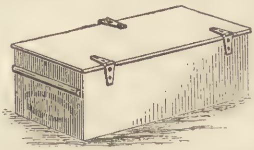


Fig. 5.—*Method of putting on hinges.*

Most growers affirm that the fruit keeps better when ventilated, (fig. 6,)

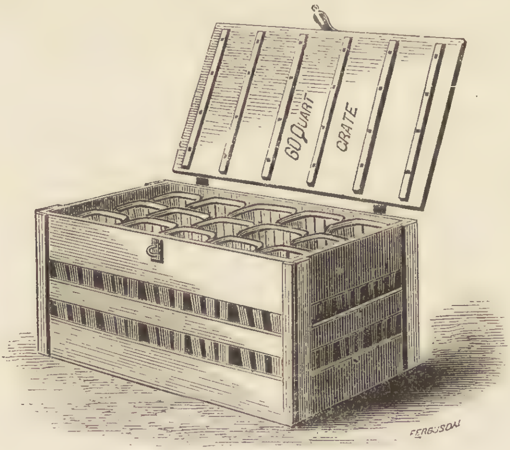


Fig. 6.—*Chest allowing Ventilation.*

especially when it remains unsold over the Sabbath ; some think ventilation makes little difference, and that the Antwerp raspberry, especially, keeps best in close chests.

Packing houses should be cool and well ventilated, and the packing

delayed as late in the day as possible, and when packed the chests should be set in a cool place.

The neatest packages of first class fruit, sell readiest. In most of the western cities, these fruits are sold by measure ; but to prevent bruising, the fruit is not generally changed in New-York, from the basket it is picked in, until it reaches the consumer.

Along the Hudson river and some other places, baskets and boxes, three of which hold a quart, are favorites for both Antwerps and strawberries.

Pint and quart cups are coming into general use elsewhere, especially for larger sized fruit. The practice of having different sized baskets, hold-

Fig. 7.—*Close Chest.*

ing a half pint to a pint, and selling by the "basket," must give place to more definite and exact measure. This subject has been before the Legislature of New-York, and has been discussed by the Farmers' Club of the American Institute, New York. But the interests and investments in various sized baskets, and the machinery for making them, as yet have prevented any action. We suggest the following as fair all around ; market berries shall be sold by measure, and pint and quart cups are recommended, but where other sizes are used they should be of uniform capacity, and the exact quantity they hold must be marked on the chest or crate.

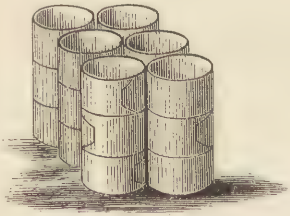


Fig. 8.—*Mode of packing round boxes.*

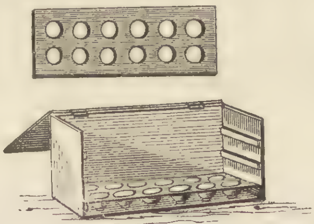


Fig. 9.—*Section of chest for carrying earthen bowls of fruit—showing board with holes to receive them.*

Fruit-growers will do well to visit the market frequently and study the

tastes and preferences of consumers. If cups or baskets of certain forms or sizes are preferred, it will pay to humor them. Sometimes care in arranging the fruit on the tops of the cups, pays for the labor, although it is not recommended, farther than for neatness, with such berries as the Wilson, where the "hull," or calyx, adheres to the fruit.

It will also pay to discard stained baskets or cups, and buy new, oftener than it is done. Some berry-men, aware of this fact, use white earthen bowls, (fig. 9,) so packed as to carry safely, and claim that they get back the price of the bowls every year, in the higher price of the fruit, and suffer little loss from breakage.

Fig. 10.—*Mode of packing baskets of Strawberries.*

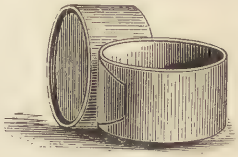


Fig. 11.—*Round Box.*

BASKETS.—The old fashioned splint baskets hold from half a pint to a pint—cost $15 to $20 per thousand, (fig. 10.) The Milton Round box, (fig. 11,) made of elm, steamed and bent round a pine bottom, holds one-third of a quart, is a light, durable and neat box, the best we have used of that size. Price $25 per thousand. The common square box (fig. 12,) made of a single thin piece of basswood, whitewood or pine, cut partly through so as to bend at the corners, (fig. 13,) and tacked around a square bottom, is advantageous in economy of space, requiring chests little more than half as large for 100 square boxes as for the same number of baskets.

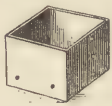


Fig. 12.—*Square box — bottom "set up"— sides of one piece, bent at corners.*

Fig. 13.—*Strip of thin wood to form square Box.*

The "Veneer" basket (fig. 14,) holds a pint, and is a very neat and strong basket, manufactured at Westville, Ct.

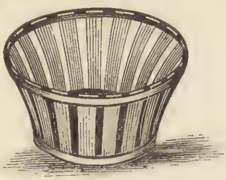


Fig. 14.—*Veneer Fruit Basket.*

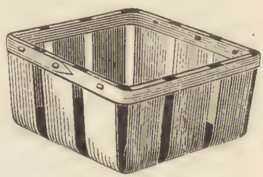


Fig. 15.—*American Basket.*

The "American" basket, (fig. 15,) quarts and pints, is a very neat, light and fancy basket, made at New Britain, Ct.

Various plans for cheap "gift boxes," to go with the fruit, have been

gotten up— to cost from $8 to $10 per thousand. The octagonal box is made of two pieces of veneering—that for the sides being cut partly through at the corners, so as to bend around the bottom and fasten with slips of tin.

The Burlington free fruit box is represented in fig. 16. The advantage of these is that they are always fresh and clean, and not having to be returned, may bring enough more to pay for the box. Especially when sent to a distant market, this is very desirable. But when near, it is cheapest at present to buy good strong cups, use them three or four years, throwing aside those much stained ; in this way the same cups may be used six or eight times.

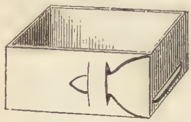


Fig. 16.—*Gift Box.*

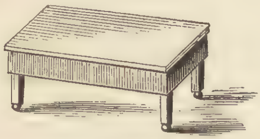


Fig. 17.—*Bench on Castors for packing Chests on.*

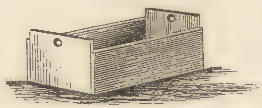


Fig. 18.—*Box for Currants, Cherries and Grapes, with higher ends to protect the fruit when set in tiers.*

A bench one and half feet high on rollers, (fig. 17,) will be found very convenient to place the chests upon when packing.

For marketing currants, cherries and grapes, boxes (fig. 18,) made of thin stuff the right size to fit the berry chests, and to hold from 5 to 15 lbs. are used. Some have the end pieces wider than the sides, to prevent the upper boxes touching the fruit in those below, and allow of ventilation. A grape box made of veneer, (fig. 19,) very light and cheap, to be sold with the fruit, and so arranged that the box can be packed with the top down, and when full the bottom fastened with a few tacks, is one of the neatest we have seen. When the covers are removed the box is level full, and the fruit appears in fine order, the bloom of the grapes not much injured. Picking baskets should be made five or six inches deep, with the sides perpendicular—or a box with a handle, like a basket, and also furnished with legs, (fig. 21,) is cheap and handy.

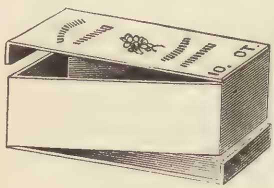


Fig. 19.—*Grape Box*

The most profitable pickers are women and girls, about ten of whom are required to pick an acre. They usually board themselves and pick for 2 to 3 cents a quart, each picking from 100 to 200 baskets daily, or from 30 to 60 quarts. Pickers are hired for the season—they must be instructed to fill the cups a little more than level, arranging the last on the cup neatly, so that no further handling will be necessary, for *every touch*

injures the ripe berries. Each one has a shelf assigned for the cups she picks ; thus the work of each can be inspected and counted. Sometimes a

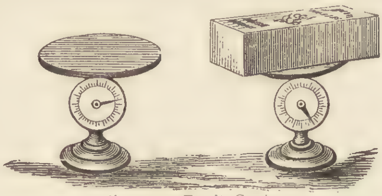


Fig. 20.—*Fruit Scale.*

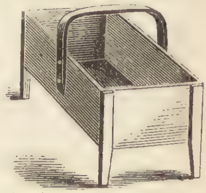


Fig. 21.—*Picking Stand.*

small premium is awarded for the neatest and most evenly filled cups, and, sometimes, not only the cups of some must be filled up properly, using a few of the picker's own cupfuls,but the vines must also be examined to see that they are picked clean. It has worked well with us, to give each picker a certain number of rows to pick and be responsible for, the season through.

Culture of the Strawberry.

The most approved method of culture is in rows about 3 feet apart, 14 inches in the row, and clip the runners every two weeks, (6 or 8 times,) the first season ; they will not require it so frequently the next season. They should be well tilled with plow and cultivator, and hoed several times. Plants treated this way, form large "stools," (fig. 22,) and look more like rows of field beans than strawberry beds. We have counted frequently 30, and sometimes 40 fruit stems, averaging 10 berries each, springing from a single plant. We cannot too strongly recommend this system of "hill culture," as it is called. Cutting off the runners, (for which we use sheepshears) effects the same that pruning does on young trees, only in a greater degree.

Fig. 22.—*Appearance of Stools or Hills.*

A—*Beds.* Fig. 23. B—*Hills.*

The "common system," is really no system at all. Set the plants in rows three or four feet apart, and "let them run," forming beds of small plants. (A. fig. 23.) A narrow path is kept plowed between the rows, and a great deal of weeding and backache is required to keep them clean. It is so easy to

let the plantation take care of itself, that many will not believe they are losing by it; indeed, the argument is often heard, that by this new method, instead of fifty plants you have only one—one, indeed, but a big one, one that can be managed, and is worth for fruiting purposes a hundred puny ones.

From careful observation we can affirm that "hill culture" admits of easier and better cultivation. The plants do not require mulching so much. If not eaten by the grub, they will last for years, and the grub does not injure them so much as it does the small plants.

The fruit is much larger and the product greater on an acre, and it is all easily found by pickers. And when plants are desired, a few rows may be allowed to "run," or after picking the fruit the first or second time, the "hills" may be allowed to send out runners, especially if it is intended to renew the plantation. Although by this culture the same plants will bear for years, it is usual that the first crop is the best. And some cultivators plow them up after first crop, and plant some other crop after strawberries, before renewing on the same ground. We are trying another plan, planting 2½ feet apart each way, and cultivate and plow both ways. Cutting the runners by a strong knife or revolving wheel with sharp edges attached to the side of a light narrow horse hoe or cultivator, (fig. 24.)

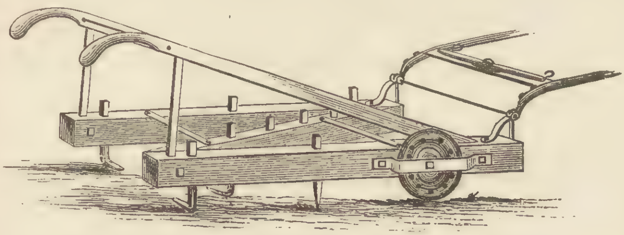


Fig. 24.—*Cultivator with sharp wheel for Cutting Runners.*

This plan of a cultivator we believe was first invented by Rev. M. F. Liehman, of Highland, New-York. The sides of the cultivator are parallel, and the middle piece is arranged so that the implement can be made wider or narrower at pleasure. The wheel is of cast iron, with segments cut from an old saw riveted on; the teeth may be merely harrow or cultivator teeth, or a set of knives made of an old carriage spring and bent at right angles, the bent part sharpened; these work admirably for cutting the weeds beneath the surface. By attaching thills the cultivator is held more steadily; doubtless these should be solidly attached to the implement, as in Alden's horse-hoe, to make it easier turning at the ends of the rows, &c.

Strawberries grow best on warm soils; strong soils are said to be benefited by a top-dressing of sand, and light soils by composts of muck. The ground should be underdrained, but not such as is apt to suffer from drouth.

It should be as free from weeds as possible ; for instance, new ground, or a clover sod, plowed the autumn before planting. The sod of other grasses should have a crop of corn or potatoes taken off before planting. But if the "white grub" be found plenty, better try another field ; they frequently eat up whole plantations. A little care in examining the soil to ascertain their presence, may prove valuable—another field may not contain many. Ashes and such composts of muck or leaf mold as are pretty free from weed seed, are the best manures. Barn-yard manures are better for raspberries and other vines.

For winter protection, in some soils, little more is needed than a furrow thrown up to the rows in autumn ; on others, the action of the frost is very destructive if the vines are not mulched. For this, use rye straw, (cut short if convenient,) or shavings, sawdust or tan—a handful on each plant is sufficient. It will answer also to place beneath the plants the next spring to keep the fruit out of the dirt.

Spring is the best time for planting for field culture. Fall planting may be resorted to, to secure garden fruit the next season, in case it has been neglected in spring—in which case, the earlier planted, for instance after a July shower, the better. In gardens they may be planted thus, in the shade of trees, Indian corn, or other crop. Only a small quantity of fruit, can be expected the next season, but it is large and early.

Strawberries can be produced for from 3 to 5 cents per quart. Picking and packing costs 3 cents, and marketing about 3 cents. All received over 10 cents per quart, is the grower's profit. The average net price for the two past years was 20 cents per quart. The average yield per acre, for 1865, was 3,200 quarts, and for 1866, 2,000 quarts per acre, field culture. The profits were nearly equal on account of the higher prices of 1866. The estimate from which these averages have been derived, range from 1,000 to 6,000 quarts per acre, and the gross receipts from $200 to $1,000 per acre.

The sale of plants is often profitable, when there is a demand for them —100,000 or more may be raised on an acre, after fruiting. These may be sent safely to almost any distance, when put up in bunches of 25 to 50 —(the vines attached are strong enough to tie with.) These bunches should be packed with the tops each way, roots together, in alternate layers with *dry moss.* They should be placed so that air and light may get to the tops while the roots are embedded in the moss, (fig. 25.) If sent to a considerable distance, too much care in *drying the moss* cannot be taken, as it rapidly absorbs moisture ; and narrow boxes should be used, not made tight, which hold one tier of bunches, unless the different tiers are held apart by slats, so as to admit air and light, and prevent heating. (*Raspberry* roots and *Grapevines* are usually packed

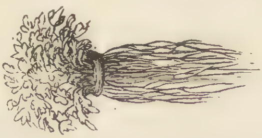


Fig. 25.—*Bunch of 25 Strawberry Plants, for Packing in Moss to send to a Distance.*

in damp or wet moss.) When moss cannot be had, strawberry plants may be safely sent with the roots coated with mud.

Fig. 26.—*Garden Trowels.*

For transplanting we use a small garden trowel, (fig. 26,)and set as deep as the roots allow, spreading them as much as possible, and pressing the dirt closely. Plants may be kept weeks in a damp place, but the roots should not be allowed to dry before setting. The evening is the best time for setting, and if the ground be very dry, water immediately.

We set out on level ground, either by a line or mark the rows by some simple method. If however, the ground or any part of it, be not sufficiently drained, plant on low ridges, made by two furrows thrown together. We do not hoe after the fruit sets. If the ground be placed in good order early in spring, nothing except mulching to keep the fruit out of the dirt, is required till after fruiting. All blossoms, especially on late set plants, should be removed the first season. Mowing off the tops after fruiting, has been tried by some and recommended. We tried it but once, on a bed, but thought the advantage was owing to checking the weeds. If it prevent the plants from multiplying, it may be worth experiment on plants in beds.

In gardens a plant can be grown on every square foot of ground, and be tilled with hoe and spading fork. If properly mulched, and the runners kept off, they will bear from a pint to a quart each, for several years. A small spot thus cultivated last year, produced *at the rate* of 14,400 quarts per acre, and sold at the rate of $4,000 per acre. This is mentioned to show how mechanics, poor women, or any body possessed of a garden, may find it profitable. The above was the result of the garden culture given by two small boys.

Culture of the Raspberry.

The Hudson River Antwerp was brought from England, and first propagated by a gentleman in Poughkeepsie, and introduced into Ulster county, by Edward H. Young, of Marlborough. The "Antwerp region" appears to be limited to the warmest soils and somewhat sheltered situations, between the Highlands and Catskills. In some towns every farmer almost has his "patch" of Antwerps, of from one quarter acre to five acres and upward. Generally, however, one acre well manured and cared for, pays the farmer better than a larger plantation, unless he relieves himself of most of his farm work.

After the second year each hill must be tied up to a stake (figs. 27 and 28,) about five feet high, which may be prepared in winter, at a cost of $10 to $15 per 1,000, and will last ten years.

Fig. 27.—*Hill of Raspberries when first tied to stake in spring.*

After fruiting, the old canes are to be cut out, the ground plowed and hoed, the stakes removed to shelter or stacked in the field; and late in the autumn the young plants in the hills, are removed, and the canes left are bent down, (fig. 29,) and slightly covered with earth for winter protection.

Fig. 28.—*Antwerps, tied to a stake.*

They are usually planted three or four canes in a hill, four or five feet apart each way; cut back to a few inches high when planted to prevent bearing, and secure a good growth the first year. They do not usually produce a full crop until the third year, and they continue to bear for many years; some fields have been planted fifteen years, and are yet doing well.

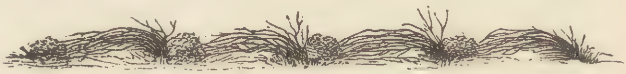


Fig. 29.—*Antwerp Raspberries Bent Down and held by a Shovel of Earth, till covered with Plow for Winter Protection.*

The white grub works on their roots almost as disastrously as on the strawberry. Some growers think the present stock degenerating, and efforts have been made to import a fresh stock of the same kind. Others attribute the apparent weakness to local causes, and some do not admit it at all.

Antwerps do best when slightly shaded, and are frequently cultivated in young orchards, or among grown trees, so that both are benefitted. Products vary different years, much depending on securing a good growth of canes, and on good showers just previous to, and during the picking season, which commences about July 5th, and lasts five or six weeks. The yield is from 1,000 to 4,000 quarts per acre, to which may be added the value of the young plants, which often amounts to 5,000 per acre; worth from $3 to $40 per thousand.

The best soils are shaley and gravelly loams, such as are peculiar to those sections which the Hudson river slates and shales underlie.

The "Black Cap" and "Philadelphia" are in course of trial, with promise of success. They are hardy, require no staking, and consequently may be produced at much less cost. The fruit of each bears transportation well, but is not so highly prized as the Antwerp.

Culture of Blackberries, Currants, &c

Blackberries compete with other fruits, especially with peaches, and sometimes are not sure of a ready market. They are often grown at little expense, on rough ground, useless formany other crops, and may be pruned

Fig. 30.—*End view of row of Pruned and Plowed Blackberries.*

Fig. 31.—*End view of Unpruned Blackberry row.*

with hedge shears and bush scythe. Some growers realize from them more in proportion to the labor than other fruits, while others soon discard them.

Currants are growing in favor. The Red Dutch and Cherry are preferred. La Versailles is being introduced, and Black Naples sells well in market. Currants are planted five feet apart each way, and treated to clean culture. The finest quality, though not greatest quantity, is claimed for the tree form, which is obtained by removing all buds from the scion below the ground when planted. The shrub form is more hardy, and generally reproduces itself from the root in case of breaking the top. The currant worm has not appeared to do great damage in most parts of Eastern New-York.*

* In Western New-York the *Currant Worm* is easily and completely destroyed, and the crop and bushes saved, by sprinkling the leaves with White Hellebore, by means of a dredging box, which has fine holes, so as to give a thin coating of the powder. A few repetitions of the operation through the season, as needed, will exterminate these insects, but it is necessary to watch the bushes, and to apply the remedy at their first appearance. Those who complain of the failure of this remedy wait till the destruction is half completed before they begin. The White Hellebore may be had at the drug shops. Care must be taken not to inhale it. The first rain washes it from the fruit, and no harm results. For safety, the fruit should be washed before using, and previous to stemming. The *Rose Bug* so destructive to the blossoms of the grape, must be watched for about the last of June. Husman speaks of carrying torches at night through the vineyard, as destructive to insects. If it prove so to the Rose Bug it is worth attention. Fires lighted around the vineyard, burning the apple tree and other brush prepared for the purpose, especially if done by several farmers or vineyardists on adjoining lots, has been suggested for trial. Plowing the ground late in autumn has also been recommended to destroy the larvæ—a small white worm. The *White Grub*, so destructive to strawberries and other fruits, as well as potatoes and other crops, is said to remain in the ground in the larva state three years, when it changes to the insect form, producing what is termed the "June Bug" or "May Beetle." Every possible means of destroying or avoiding these grubs should be resorted to. Chickens will sometimes pick them up after the plow. Boys and girls paid for every hundred picked up and dug out from beneath strawberry plants that look like withering, and for the Rose Bugs picked from the grapevines, are the best remedies we have found. A mixture of sulphur and plaster, dusted over the vines, has been recommended as a remedy for the Rose Bug.

CHERRIES are profitable and cheaply produced. We have noticed the birds prefer the early sorts to strawberries, which may be worth planting to save the strawberries.

Some trees of good varieties of Heart and Bigarreau, produced the past season 10, 18, 24 and 48 dollars worth. One neighbor sold $90 worth from five trees, mostly the product of three of them. Being both ornamental and useful, the farmer cannot err in planting too many.

PROFITS OF BERRY CULTURE.

The profits of farming vary with the condition of the land and the brains that drive the business; but it will not be far from the truth to assert that in many parts of the country, convenient to market, common farming has ceased to be remunerative. After deducting expenses for utensils, wear of buildings, cost of manures and labor, little or nothing is "laid by" at the end of ten years. The farmer is obliged to use his money as fast as he makes it. In fact, with many, debt is their normal condition, and paying interest a part of their creed. Another class, less fortunate, are content to rent farms and migrate yearly. "Cropping" the farms of others is the business of their lives, never knowing what it is to feel on one's own ground—"I am monarch of all I survey."

It may be true that there is no such thing as a "worn-out farm," but many are terribly thread-bare; yet these may be well suited to fruit culture. Small quantities of manure may be afforded to each tree and plant every year, till the productiveness of the soil becomes such as to pay a generous income. Strawberries may be cultivated among grapes, and raspberries in the orchard. Many farmers have already proved that an acre or two, devoted to fruits, bring in just about harvest more ready money than the whole of their surplus products from the farm—not much heavy labor—no dusty threshing required. Poor women and children are eager to pick the fruit, and all the year look forward to "berry time" as the season of their most profitable employment. The weeds may all be pulled by the same cheap laborers.

An acquaintance who used to farm about 100 acres and employed two men all the year, averaged gross sales of $1,400 a year. He now has about five acres in small fruits, the net income of which was $2,650 last year. Putting most of his farm in grass and keeping several cows, he manages to have a surplus of four to five hundred dollars a year from the farm, and a supply of manure for his vines.

The following estimate is the cost of a two acre vineyard with strawberries cultivated in it—also the first three year's income:

Cost.		*Income.*	
700 Grapevines,	$100.00	Grapevines and Cuttings,	$150.00
700 Stakes,	15.00	Sale of Strawberry plants,	700.00
12,000 Strawberry plants,	60.00	Strawberries,	1,150.00
Grape trellis,	225.00	Grapes,	500.00
Labor, 3 years,	300.00		
Rents,	60.00		2,500.00
Manure used,	50.00		835.00
Wear of tools,	25 00		
		Profit,	1,665.00
	$835.00		

In the following estimates the average is taken from the actual products of many farmers and fruit growers of New-York and New-Jersey.—Thorough culture can seldom be given when the farmer has grain crops also to be attended to, and for this reason the averages will not satisfy those who make fruit-growing a specialty—who spare no pains or expense in studying out and supplying the wants of their plants. Such persons will often double and quadruple the results of common field culture, and then, probably, not develop the full capacity of generous gratitude these fruits return for special attention. The following are the highest results we have information of:

Strawberries, 1865.—Half an acre of Wilson's Albany, "hill culture," at the rate of 6,100 quarts per acre—one and a quarter acres, hills, 6,000 quarts per acre. An eighth of an acre, Triomphe de Gand, at the rate of 3,600 quarts per acre—1866: Two and a half acres, "field culture," 4,280 quarts per acre.

Raspberries are reported as having produced from 5,000 to 7,000 quarts per acre.

Blackberries—2,000 to 3,000 quarts per acre.

Currants—Six tons per acre, worth $1,000.

The following table shows about the average cost and profits of small fruits, as usually raised by farmers, except the profits from sale of plants:

	No. of Plants per Acre.	Cost of Plants.	Cost of Preparing Ground & Planting.	Total Cost of Labor Yearly.	Cost of Chests and baskets for markt'g.	Product and Income		
						1st Year.	2d Year.	3d Year.
Strawberries,.	10,000	$50	$30	$100	$150	Plants only.	Product—Value. Plants. 2,500 qts., $450.	Product—Value. Plants 1,500 qts., $300.
Antwerp Raspberry,	9,000	100	25	85	120		Say $50.	Plants, 2,000 qts., $400.
Grapes,.....	500	125	30	60	65		Cuttings and Layers.	Cuttings. 2 tons, $500.
Currants, ...	1,600	130	20	40	100		....	1¼ ton, $200.
Blackberries,.	2,000	30	20	40	75		Small Crop.	1,500 quarts, $250.

VALUE AFTER THE THIRD YEAR.

Strawberries—Need renewing biennially.
Antwerp Raspberries—$300 a year, besides plants, for a dozen years.
Grapes—Valuable for a lifetime.
Currants—Two to five tons annually if the currant worm is kept off.
Blackberries—A permanent investment not easily got rid of, worth $200 a year.

Blackcap Rasberries, and the "new sorts" of fruit, we have not sufficient data to average.

It is worthy of notice that in places where summer fruits are successful, the land rates highest in value, although it may be inferior farm land. Convenience to market and traveling facilities, fine scenery, and otherwise fa-

vorable situation, often contribute to increase these values, but not so uniformly as adaptation to fruits.

New-Jersey farm lands have increased from $43.50 per acre in 1850, to $60.50 in 1860—$17 in ten years. Delaware lands have increased in the same period $11 per acre. New-York farm lands from $29 to $38—or $9 in ten years. This rapid gain in the price of New-Jersey lands, is attributed mostly to the increased production of market fruits.

But not alone near markets, is the culture of small fruits recommended. They will command a ready sale at paying prices in almost every town and village. The people confined to the shops and factories, want fresh fruit, and it is often out of their reach. It is a sanitary blessing to the thousands of city consumers, and to the family of the farmer it is invaluable. From June to June, they may have a succession of varieties, and a constant supply, by little extra care in canning and keeping. Even at distant points, there is a chance for growers to assist in supplying the New-York market. The Triomphe de Gand strawberry, and often the Wilson, are brought from Pittsburg and Lockport.

North of the Highlands we usually get our highest prices for our latest strawberries, which go into market after the Southern supply is gone; farther South, the very earliest sell best. These fruits ought to be cheaper —they ought to come within the reach of the poor—the fall in price ought to be caused by the increase in quantity; nor should quality be ignored; superior fruit always sells readiest, and at extravagant prices.

The demand has not reached its maximum. The tastes and appetitites of the people are growing faster than our trees and vines. The markets are seldom glutted with good fruit—only the poor and damaged lots fail to pay a profit. As the price is reduced by the greater supply, it comes within reach of thousands more of appetites already sharpened to consume it.

Culture of the Grape.

Little need be said in addition to the article on "The Culture of the Grape," in last year's Register. Fig. 32 shows a very good

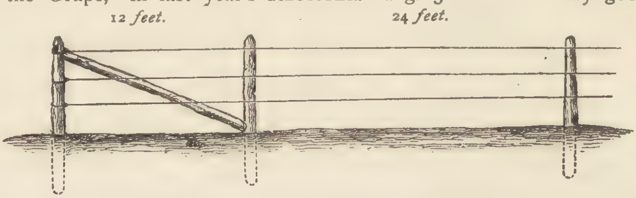


Fig. 32.—*Stout Trellis, for Long Rows in Vineyard. Posts 6 feet high—3 feet in ground.*

plan for bracing the end posts of a long trellis; it represents also a portable "reel," on which the coil of wire is placed, which turns on the spindle, allowing the wire to be drawn easily and expeditiously along the rows. An iron pin (fig. 33,) flattened at one end and pierced, so as to admit the

end of the wire and fasten it, is used for attaching the wires to the end posts. The pins are about six inches long and three-quarters of an inch in diameter; they should be oiled to prevent rust, and driven into holes bored in the end posts; turning the pin with a wrench or claw hammer, tightens the wire. A wrought nail driven beneath and bent over the wire is used instead of a staple, to attach it to the other posts. (These methods are used by O. J. TILLSON, Highland Vineyards, New-York.)

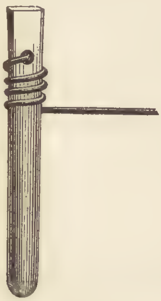


Fig. 33.—*Iron Pin*

Sometimes it may not be convenient to erect a permanent trellis the third year, as usual in training on the horizontal arm system. The vines may be trained a year or two, and kept in proper shape, on a temporary trellis made of two or three stakes and some cheap lath. Poles cut from the undergrowth of the woods, last long enough for grape stakes.

The profits of Grape Culture, since propagating plants is growing into a separate business, will not probably sustain a "mania" by such estimates as are frequently reported. Take out the income from the sale of plants, and many of the "high figures" that now feed our imaginations, would be cut down one-half. Many parts of our country will doubtless become famous for vintage, and some variety or other may be found adapted to every section. Good grapes may become cheap in market, and be served on farmers' tables as extensively as apples or peaches in the olden time. But there is possibly need of some caution; first testing varieties in our different soils and climates, before going to great expense in planting a vineyard, risking mildew and the rose bug, guessing at the pruning and culture, or giving little of either, on account of other work. Such investment may not in every case prove the best for the farmer.

Two tons of market grapes to the acre, is enough to allow the vines to bear, and the income from this will doubtless pay, where proper attention is given to secure fine fruit. But when it comes to selling poor crops to wine makers, for from $60 to $100 per ton, the enchantment is gone, as well as the profit; and the morality of this part of the business, admits of serious question. It is a doubtful search of temperance amateurs, for a grape making a wine so deficient in alcohol, that it may be recommended as a beverage. They will find it growing by the "Fountain of Youth," with the "Philosopher's Stone" at its root.

Large growers may realize large profits from wine making; farmers are not likely to do so. And we trust those planting will only plant what they can attend to well; and that every body will thus plant, until Greeley's town prize may be earned by every township in the Union. We trust that the demand for table grapes will increase with the supply, that easy me-

thods of keeping through winter may be discovered, and that jellies, &c., may use up the unmarketable fruit.

The vineyard—as indeed all fruit culture—requires educated labor. Great injury may be done by improper pruning or thinning. Some place their vines too much on the procrustean bed; others allow nature too much liberty. Each vine requires peculiar treatment, to some extent, and affords a separate study to the vine dresser. But this is a good feature, requiring study, posting up, waking up. A man (or woman, for ladies are entering this part of their original sphere,) cultivating fruit intelligently, soon finds that he has made a growth himself while watching that of his vines. He will take the Agricultural journals; read the best books on his profession; attend the Farmers' Clubs; help get up the Horticultural festivals and exhibitions, and in every sense become more of a *man;* fed on better fruit, and better steak, than had he continued his ancient customs of "hog and hominy" and "pork and beans."

Then plant the vines and the trees; you will be paid in many unexpected ways; by the increased value of your farms, the use of fruit in your families, the reading and study, or brain culture you will be led to acquire, the ornament and beauty almost sure to be added to your grounds, and your increased appreciation of it—the education of your children in such a home—in fact you may "sit every man under his vine, and under his fig tree." (In this stern climate "fig tree" may be understood figuratively, to mean cherry or pear tree.)

We love to eat of the trees our fathers planted; they did not plant enough; let us be wiser. The work is pleasant, it is exhilarating,—and *work* we must expect, for even these average profits are not vouch-safed to those who don't like to share that blessing in disguise—"in the sweat of thy face shalt thou eat bread," although dressing and tilling their vines might approximate to a physical return to Eden.

SHRUBS AND SHRUBBERIES.

WE SEE TOO LITTLE ORNAMENTAL PLANTING of the right kind. Americans have made less progress in this decorative but very useful art, than in nearly every thing else. Fine and costly buildings are erected, on which thousands are expended, surrounded by meagre improvements that have scarcely cost a hundred dollars. Some years since we examined a western city with magnificent buildings and many thousand inhabitants, without finding a single neat, well-kept door-yard that had been planted with taste. It is true, there are many exceptions all through the country, but this nevertheless, is the great and leading deficiency. Doubtless many are deterred from improvements of the kind by the mistaken belief that they require a large outlay of money. Planting may be either cheap or expensive at the option of the owner, without

reference to the taste displayed in its execution. The disposition of a few trees on a small piece of ground, may be really better than heavy expenditures in grading and planting broad acres with nothing but cost to recommend them. The defect arises from a want of thought. The owner does not feel an interest in the beauties of landscape forms and outlines, nor in the rich shading of well-disposed foliage ; but his mind is exclusively upon his business—his profits—dividends and accumulations. If he cultivated a taste for the beauties of nature he would see much to admire, even in a few well-disposed groups at his windows, and they would become a source of never-ending pleasure. But if he plants only for show, his large outlays for this purpose feed the eyes of others, while he starves himself.

The owner of a farm or of a village lot may ornament the grounds about his dwelling at little or heavy cost, just as he may choose. A farm house may be surrounded by a few large spreading trees, (fig. 34,) that shall afford all the richness of light and shadow seen in the most magnificent park, only on a smaller scale,—at almost no cost after the trees are planted, by either allowing the grass to be cropped short under them by sheep, or by cutting it with the scythe a few times during the summer, preventing it from growing more than two or three iches high. Unfortunately too many prefer a ton of hay to a fine shady refreshing lawn, and allow the grass to grow two feet high for mowing ; and they have their reward.

Fig. 34.—*Large Spreading Shade Trees.*

Next in cheapness, after the planting of trees, is the formation of shrubberies. The young plants, it is true, must be well cultivated for a time as well as the larger trees ; but if free growers are selected, such as the Tartarian honeysuckle, the Philadelphus, the Siberian lilac, the purple Fringe tree, Barberry, &c., they will require comparatively little attention after being well underway. The great advantage in employing shrubs instead of trees is in the larger number and the greater variety which may be introduced into a limited space ; and they may be so disposed by planting the lower or shorter kinds as to leave open views towards distant objects of interest, at the same time concealing the boundary fences. By selecting the finest bloomers a succession of flowers may be had through a large part of the season.

Advancing in labor and cost, the next after the shrubbery is the flower

garden made up of herbaceous perennials ; which, like flowering shrubs, may remain unmoved for years where they are planted, but they require more care and cultivation to preserve vigor and ample bloom. And lastly comes the flower garden, made of annuals and bedding plants—the former to be planted every spring, and the latter wintered in green-houses, ready for setting out in beds when the warm season arrives.

The most perfect and finished grounds have a combination of all these —trees, shrubs, herbaceous perennials, annuals and bedding plants. But unless they are arranged with knowledge and skill, instead of forming a beautiful assemblage as a whole, the whole collection will be more likely to degenerate into a mass of confusion. It too often happens in planting a new place, that trees and shrubs are closely mingled together, and flower beds perhaps, placed in the shade of both. In a few years the trees outgrow the others which are shaded, stunted and deformed, and the trees themselves ultimately become a crowded mass. The remedy is intelligence and forethought. Distinct, well understood plans, must be made beforehand. If large trees are introduced at all, they must be placed toward the outside, so as not to shade nor hide the others. Small trees and large shrubs come next, and those of smaller size and herbaceous flowering plants are to be so disposed that they shall always have plenty of light, and not be crowded under by their larger and broader neighbors. And yet a regular and formal amphitheatre is not to be formed, for, as already observed, the boundaries should be low or open in the direction of the finer views, and the taller trees placed only where it is desirable to shut out unsightly objects or protect from strong prevailing winds.

The shubbery—the object of the present article—may thus be a component part only of a larger plantation, or it may cover nearly the whole surface of limited grounds. Sometimes an extended walk leading from one point to another, may be lined on one or both sides with ornamental or flowering shrubs—the taller kinds prevailing in some places and the shorter in others, as it may be desirable to conceal or open the view towards other objects.

There are two particular modes of disposing or arranging shrubs in planting them out. One is to place them in a continuous plantation, the taller in the rear, and decreasing gradually in height toward the foot-path or spectator ; and the other, is to distribute them in beds, groups or clusters. It will generally be found best to adopt both these modes—the former for exteriors and the latter for central or open portions of the grounds. Such shrubberies as these should be laid out like modern or natural flower gardens—where a smoothly shaven grassy surface or lawn is traversed by bending gravel walks among circular or oval beds, cut in the turf, containing the flowering shrubs.

Much of the beauty and effect of these groupings depends upon bringing together such kinds as will form a pleasing combination. Too many of the same sort will produce sameness ; and if too unlike, incongruity

would be the result. Different species of the same genus group well together as they have a common resemblance and yet some difference. The several species of Spiræa, for instance, are sufficiently unlike in foliage, color of flowers and habit of growth, to give variety of outline without formality. The same remark may be made of the Viburnums. Shrubs which bloom at the same period and which have some similarity in growth, may with propriety be grouped together, or at least placed in proximity. Among these may be mentioned as examples, the Forsythia and Cornelian Cherry; the Missouri Currant, Crimson Currant and Japan Quince; the Double Flowering Almond and Spiræa prunifolia; the large flowering Dogwood and Judas Tree; the common Lilac and Tartarian honey-suckle; the Laburnum and Rose acacia, &c.

It is important when shrubs are first planted out and for a few years afterwards, that the soil be kept deep, mellow and well cultivated. If allowed to become hard and covered with grass, the growth will be feeble and meagre. and fine, full and luxuriant forms cannot be attained. It would always be best if practicable to trench or subsoil the whole surface of the ground intended for the shrubbery; to enrich it well by successive additions of old manure or compost during the preparation; and to continue the constant cultivation of the soil for several years until a good growth has been attained. The vacant or open portions may then be covered with grass, and the soil immediately about and among the shrubs still kept open, in the form of regular beds or borders. If, however, the lawn or grass surface has been already formed, the beds of ample size may be cut in it, dug deep, well enriched, and kept constantly mellow for successive years after planting.

A sufficient amount of pruning or pinching back should (figs. 35 and 36,)

Fig. 35.—*Straggling Shrub, not pinched Back.*

Fig. 36. — *Compact Shrub, made so by Pinching.*

be given to the growing shrubs to keep them in a proper form without adopting the error of making them too regular, stiff, or formal. A better shape, as well as a more vigorous growth, may generally be given at the

start, by cutting back very freely, often nearly to the ground, when the transplanting is done.

FORM OF BEDS.—There are but two forms which it is desirable to give to beds of shrubbery ; namely, the circle or ellipse, (fig. 37.) Indeed all that is necessary may be attained by the adoption of the circle only—a sufficient variety with which may be imparted by making the beds of different sizes and distributing them singly, or grouping them together. Those of smaller size (fig. 38,) may contain from three to half a dozen plants. The larger ones may be occupied with a considerable cluster or mass, in which case the taller kinds should be at the centre, decreasing gradually toward the ouside, (fig. 39.) It may also be observed that generally the best effect will be produced by planting the centre with those which have dark and heavy foliage ; and the exterior with such as are more light and feathery in form. Again—in planting those which are conspicuous for their brilliant berries, it will be found best to occupy the centre with some dark evergreens, against which, these shrubs, planted around them, shall form a fine and brilliant contrast in color.

Fig. 37.—*Bed of Shrubs.*

Fig. 38.—*Small Bed or Group of Shrubs.*

An important advantage in adopting the circular form, is the facility with which the outline is marked on the ground ; and even after the shrubs have attained some height, the boundary may be accurately renewed by driving an upright stake *a.* (fig. 40,) in the middle for a pivot, on which an arm *b.* may revolve, having a rod *c.* at right angles, pointing downwards, for forming a circular scratch on the surface of the ground. A perfect ellipse is easily made by driving two small sticks *a. a.* (fig. 41,) into the ground, placing a cord *b.b.* in the form of a loop upon them, and then stretching this loop with a marking stick *c.* and scratching the surface of the ground through the whole circumference.

Fig. 39.—*A Group of Large Shrubs.*

Those who are about to form a shrubbery and who are not very familiar with the different species will find a great advantage in adopting the following practice. Make a general collection of all the shrubs intended for the plantation, either from nurseries or otherwise, as early as possible, and plant

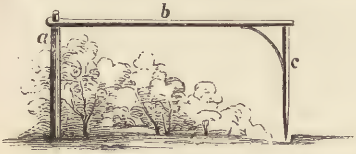


Fig. 40.

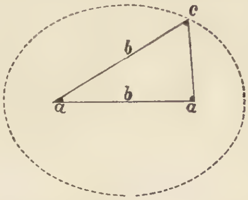


Fig. 41.

them in rich soil in nursery rows where they can receive high cultivation. They will here increase in size, and may be trained in the proper form ; and when ready for final removal, the whole mass of the roots may be taken up and set out again with little difficulty, with almost no check in growth. From one to three years might be thus occupied in the nursery row, during which time the owner will find it a most interesting occupation to study their modes of growth, character of foliage, time of flowering, and whatever else may enable him to group them handsomely together. In the meantime, he may underdrain, trench, enrich, and otherwise prepare the ground that is finally to receive them, in the best manner, as well as fully to digest and mature his plan. Another advantage in first planting them in a nursery, is that he will be enabled to increase them in number in many instances, by dividing the roots.

In furnishing the following list of hardy and desirable shrubs, such as are adapted to general cultivation, it will be most convenient to the planter to divide them according to their size or height, so that they may be placed together.

No very accurate sub-division, however, of this kind can be made, as they vary considerably with soil, climate and treatment ; and some, usually regarded as quite small, will after the lapse of half a century or more, reach a height of several feet. If any are found to be too tall for their compeers, they are easily cut back or removed.

Shrubs of Small Size.

Ceanothus, (*Ceanothus Americanus.*) A small shrub of neat appearance bearing numerous bunches of small white flowers ; and if well cultivated and trained in form is quite ornamental. It is hardy and frequently grows wild throughout this country. It is sometimes known as the New-Jersey Tea.

Tree Pæony, (*Pæonia Moutan.*) Although a low shrub this plant when full grown and in bloom presents a magnificent appearance. The variety known as the Banksia, has bluish colored flowers usually about six inches in diameter and very double—single plants often showing fifty or sixty at a time. Several years are required for them to attain this size. The pop-

py-flowered variety is single, white with a purple spot at the base of each petal. The variety rosea is semi-double with rose-colored flowers. This shrub is quite hardy, but is difficult to propagate. The easiest mode, which is, however, quite slow, is by dividing the roots. For this purpose the plant should be placed in rich soil so as to increase rapidly in growth and taken up in autumn, and the stems and roots separated by means of a fine saw—every separated portion should have some roots remaining upon it. It is also propagated by layers, using the previous season's wood, tonguing and burying at least three inches deep in earth kept moist. If the growth is vigorous, roots will commence the first season, but the layers should not be removed until after the second summer. Skillful propagators increase the tree pæony by grafting into the common herbaceous species.

Deutzia gracilis, under the head of Deutzia scabra in the next division; Persian lilac, under the head of Lilacs in the third division; Kalmia angustifolia, under Kalmia in second division; and perhaps Mezereon, Clethra and some others in next division, might be placed under this head of small shrubs.

HYPERICUM *Kalmianum* is a small shrub two or three feet high, bearing a profusion of yellow flowers about midsummer. It is a native and perfectly hardy, and is usually raised from seeds.

MAHONIA, (*Mahonia Aquifolium.*) This fine shrub which is a little tender at the north, is properly an evergreen; but as its chief beauty is exhibited during the summer season, it is placed under this division. It has pinnate leaves, usually four pairs and an odd one, the leaflets being spring-toothed on the edges. It exhibits handsome clusters of yellow flowers late in spring, succeeded by blue berries. It grows three or four feet high, and needs the protection of straw or evergreen boughs in winter. It is progagated slowly by layers.

SHRUBS OF MEDIUM SIZE.

THE SPIRÆAS.—There are several species which possess much beauty. The Button spiræa or double plum-leaved, (*S. prunifolia*,) blossoms quite early in spring, bearing a profusion of double white flowers, and is perhaps the most ornamental of the shrubby species. The Hypericum leaved, (*S. hypericifolia*,) bears a profusion of quite small white flowers along its branches, and has a pretty and neat appearance, but is not showy. *S. opulifolia* and *S. lanceolata* bear their white flowers in bunches a little before mid-summer. *S. tomentosa* grows wild in many parts of the country and is distinguished by the reddish down on the under surface of its leaves, and by the handsome, compact panicles of reddish-pink flowers. *S. bella* is a native of Nepal, and produces beautiful rose-colored flowers in corymbs. There are several other species, but the preceding comprise some of the most desirable. All may be propagated by layers or suckers.

CLETHRA, (*Clethra alnifolia.*) A native shrub growing three or four

feet high and bearing spiked racemes of white flowers which appear about midsummer. It belongs to the same natural order as the Erica and Rhododendron, and has a fine aromatic odor and is easily cultivated.

THE FLOWERING CURRANTS.—The Missouri currant, (*Ribes aureum*,) bears a profusion of golden yellow flowers; and although not quite so ornamental as some other shrubs, the fragrance of the blossoms renders it a general favorite. It is quite hardy, and is easily propagated by cuttings and layers. A great improvement in its appearance may be effected by pruning it into a compact, symmetrical form. The Crimson-flowering currant, (*Ribes sanguineum*,) bears handsome pendent racemes of deep-red flowers, which appear early in spring. It is not perfectly hardy, and grows and blooms best if slightly protected in winter. A double variety has been raised, which is larger, hardier, later in blooming, but scarcely as ornamental as the parent or as easily raised by cuttings.

MEZEREON, (*Daphne Mezereum*.) This is one of the earliest and most beautiful shrubs of spring. The handsome pink flowers come out before the leaves, and nearly or entirely cover the small shoots along their whole length. The young shrubs begin to flower profusely before they are a foot high, but in the course of years they attain a height of five or six feet. There is but one objection to the cultivation of this beautiful shrub—the whole plant is poisonous to human beings, and the handsome scarlet berries have been eaten by young children—the best remedies for which are oil, fresh butter or milk. The mezereon is very easily propagated from seeds; which if suffered to become dry before sowing will remain two years in the soil; but if sown in autumn immediately after gathering, they will usually come up the following spring. This shrub is a native of the woods of northern Europe. There is a variety which has white flowers and yellow fruit; and another, quite distinct, which blooms in autumn; but these are rare.


Fig. 42.—*Double White Flowering Almond.*

DOUBLE DWARF ALMOND, (*Amygdalus nana*,) widely and well-known, is one of the handsomest of early flowering spring shrubs, its shoots presenting dense wreaths of double pink blossoms. (Fig. 42.) It is quite hardy and is commonly propagated by suckers or dividing the roots. The larger double almonds are propagated by

budding on peach, plum or almond stocks; and if kept trimmed in a compact shape are very ornamental early in spring. There are red, pink, and white varieties. These are not so double as the dwarf, some of the stamens being usually visible.

The KALMIAS are beautiful flowering evergreen shrubs, growing variously from one to ten feet high. They are often difficult to cultivate in gardens, especially if the ground be rich and in limestone regions. When they have failed to grow in such soils, they have been cultivated with entire success by carting a few hundred pounds of the sterile earth from their native locality. H. W. SARGENT, of Fishkill, New-York, widely known for his skill in the management of evergreens, says that he has found it less expensive to import plants from England, raised from seed, than to transplant from their native habitat on the mountains. They always grow best in the shade, as on the north side of a building or board fence. The broad-leaved or *Kalmia latifolia*, grows three or four feet high, but sometimes reaches ten feet. The glaucus and the narrow-leaved (*K. glauca* and *K. angustifolia*,) grow from one to three feet high.


Fig. 43.--*Rhododendron Catawbiense.*

RHODODENDRON CATAWBIENSE.—A shrub with evergreen leaves, bearing large, rich clusters of flowers with various shades of red, purple and pink. (Fig. 43.) It is most cheaply obtained by importations from the English nurserymen, and is supplied by American dealers. It is quite hardy and grows and flowers best in the shade. We have seen this shrub planted or interspersed through a natural growth of trees with excellent effect.

OAK-LEAVED HYDRANGEA, (*Hydrangea quercifolia.*) A native of Florida, but tolerably hardy at the north, where it continues flowering for several weeks during summer. (Fig. 44.) Its large panicled corymbs of white flowers give it a handsome and showy appearance. When full grown it is four or five feet high. It succeeds best in sheltered and rather moist situations. It is propagated by dividing the roots.

THE GREEN-HOUSE HYDRANGEA, (*Hydrangea hortensis*,) is one of the most magnificent of flowering shrubs, bearing large clusters of rose-colored blossoms. (Fig. 45.) It is easily propagated by cuttings and is managed without difficulty if kept well-watered. In rare instances it has grown to a height of five feet with a diameter of eight or ten feet, and with from five

hundred to a thousand clusters of flowers in a season. A correspondent of the *Horticulturist* stated in one of the early volumes, that it might be cultivated in open air about New-York, with a very slight protection—being naturally a swamp plant, if placed by the side of a pond in a shelter of thick evergreens, it would endure the winters and bloom superbly. In common garden soil its stem should be thinned out, bent down, and covered with sandy soil on the approach of winter. "In this way," the above writer adds, "I have known a single plant to attain a circumference of twenty feet, and produce more than a hundred bunches of blossoms in a season."

Fig. 44.—*Oak-leaved Hydrangea.*

Deutzia scabra (or Rough Deutzia,) bears a profusion of white flowers in the early part of summer and is one of the most ornamental shrubs. It may be propagated by cuttings or layers. *Deutzia gracilis* is much smaller and equally ornamental, and is increased easily by dividing the roots.

Indigo Shrub, (*Amorpha fruticosa.*) A shrub of medium size valued for the rich, purple spikes of its flowers; it needs pruning or pinching in, to give it a more compact form, and to prevent the straggling growth to which it is liable. Although less showy than some shrubs, it deserves a place in large collections.

Fig. 45.—*Hydrangea hortensis.*

Burning Bush, (*Euonymus.*) There are several species of this genus, most of which are remarkable for their brilliant scarlet fruit or berries, which continue through autumn, and give to the plant the name of Burning bush. The finest species is *E. latifolius* or broad-leaved burning bush, which sometimes grows ten feet high. Its broad shining leaves, and large red pendulous fruits and showy, orange-colored seeds after the capsules open, render it a fine ornament for the lawn. There are two American species, *E. atropurpureus* which has dark purple flowers, and *E. Americanus*, the flowers of which are yellow tinged with red, which are also quite ornamental in the same way, and the latter of which is of much smaller growth.

Forsythia, (*F. viridissima.*) The Forsythia has dark green stems and branches as well as leaves. It has somewhat the character of an evergreen, the leaves remaining unchanged into the early part of winter; but its chief beauty consists in its brilliant yellow flowers, which appear early

in spring before the leaves have expanded, and render it one of the most desirable of early bloomers. It often tends to grow rather loose and irregular unless the longer shoots are pinched or pruned in, giving it a more compact and better form.

Fig. 46.—*Weigela amabilis.*

WEIGELA, (*W. rosea.*) A shrub allied to the bush honeysuckle, introduced within a few years, and one of the finest ornaments of the garden. The blossoms are light-red or pink, and cover nearly the whole plant with a mass of bloom late in spring or early in summer. W. amabilis, (fig. 46,) continues much longer in bloom, but is not so showy as W. rosea. Both are easily propagated by layers.

JAPAN QUINCE, (*Cydonia Japonica.*) The scarlet variety is one of the most showy and brilliant of all our hardy shrubs. It seldoms grows more than seven or eight feet high, and requires many years to attain this size; in England it has been trained on walls as high as fifteen feet. It is somewhat irregular and thorny in growth, but may be trained into a handsome symmetrical shape, either in a rounded or ovate mass, by allowing numerous stems to spring up from the ground; or it may be trimmed to a single stem in a half-standard shape, when its pendent branches will give it a rich and striking appearance. It also forms beautiful small hedges or screens. The flowers are brilliant-scarlet and appear in spring before the leaves are fully expanded. They are an inch and a half to two inches in diameter, and cover the whole shrub with a brilliant display. It is readily propagated by layers and suckers, and also under good management by cuttings of the roots. It is usually quite hardy in the northern states, but occasionally the tips of the shoots are injured by severe winters.

The white or pink variety is similar to the preceding except in color; and while less brilliant is remarkable for the soft delicacy of its blush. It may be proper to add that if left to take its own course, the Japan quince will be apt to assume a straggling form without much beauty except when

in bloom, and care should therefore be taken to prune the exterior into proper shape.

JAPAN GLOBE FLOWER, (*Kerria Japonica*, formerly called *Corchorus*.) A shrub of moderate size and rather slender and not branching growth, bearing handsome double yellow flowers during the latter part of spring and early in summer. It is rather tender at the extreme north.

SHRUBBY HIBISCUS, (*Hibiscus syriacus.*) Known also by the name *Althæa*, and *Althæa frutex*. A well known and desirable shrub growing about six feet high in a rather erect form, the numerous branches assuming a somewhat fastigiate form. (Fig. 47.) The flowers appear about mid-summer and continue several weeks, when most other shrubs have done blooming, which adds to the value of this plant. They are of various shades from white to purple. The different varieties are mostly hardy in the northern States, although sometimes the tips of the shoots are winter killed ; the double-white is more tender. It does best in a deep, rich, light and not wet soil, and should be placed in an open airy situation where its wood will ripen. The single-flowered varieties are raised from seed which come true to their respective colors ; the double sorts are propagated by layers and by grafting on the single ones. They may be propagated also by cuttings under a bell-glass, planted in autumn and remaining during winter.

Fig. 47.—*Hibiscus syriacus.*

SWEET SCENTED SHRUB, (*Calycanthus floridus* and *C. laevigatus.*) These are shrubs of moderate size, possessing no special beauty, but generally esteemed for the high pine-apple or strawberry scent of the flowers, which are a dark purple. They bloom early in summer ; but it is stated that a succession may be obtained through the season by the removal of the terminal leaf-bud of a shoot, causing the production of two new flower-buds to each. They are propagated by layers and the division of the roots.

DWARF HORSE-CHESTNUT, (*Paria macrostachya.*) Although this is rather a loose-growing shrub, it is one of the most ornamental in the whole list, if pains are taken to keep it in compact form. It has long loose racemes of white flowers, with long projecting stamens, which give a feathery lightness to its fine fringed appearance. It blooms about mid-summer, after the flowers on most other shrubs have disappeared, and continues for several weeks, especially if growing in a rich moist soil. It is propagated by layers and suckers.

AZALEA.—The common native species, (*Azalea nudiflora*,) which grows wild in swamps in many places, is, when in bloom, one of the handsomest of all our native shrubs. The flowers appear in spring before the expansion of the leaves, and are disposed in clustered racemes. They are of various shades from flesh-color to pink and purple. Many varieties and hybrids have been obtained from this species by cultivation and crossing.

The azalea will not grow well in common soil, but requires rich moist peat, and it succeeds best in the shade. When the plants are removed from their native localities, which should be done in spring, the stems should be cut off near the ground, when, if in suitable soil, they will throw up numerous shoots and become healthy and vigorous. The most showy varieties have been obtained by cultivation. There are several distinct native species, all possessing a considerable degree of beauty.

ROSES constitute a large and beautiful class of shrubs ; but an extended article would be required alone to do them justice or to give even a partial description of the varieties. We can only state in general times that they need more cultivation and pruning than most other shrubs. With the exception of a few of the strongest growers, they must be constantly and well cultivated, keeping the soil deep and mellow, and well manured ; and cutting back early in spring so as to maintain a good supply of young and thrifty wood. In addition to all this care, a large number of the varieties require replacing every few years with young plants. Under the neglect which is too often seen, the flowers are small, meager and imperfect ; but with the attention just described, they are more than doubled in size, becoming rich, full and magnificent.

SHRUBS OF LARGE SIZE, SOMETIMES PASSING TO SMALL TREES.

CHINESE WHITE MAGNOLIA, (*Magnolia conspicua.*) (Fig. 48.) When grafted on the *Magnolia acuminata* or American Cucumber tree, the Chinese Magnolia grows to a small tree, (fig. 49) ; when worked on the dwarf species (*M. purpurea,*) it is reduced to a shrub; on its own roots, it is intermediate between the two, or a large shrub. In either case it is one of the finest of all the spring bloomers. The large size of its rich white flowers, which are about like those of the white lily, and which appear in great profusion on the branches before the leaves have expanded, renders it one of the finest and most striking objects in a shrubbery in spring. A variety of this species known as the *Soulangeana* or Soulange's Purple, was obtained by hybridization with M. purpurea. In the growth and appearance of the tree it closely resembles the Chinese White, but is distinguished in its flowers by their purple exterior. It is also a few days later and is equally hardy.

Fig. 48.—*Magnolia conspicua.*

PURPLE DWARF MAGNOLIA, (*M. purpurea,*) is a small shrub; never

growing but a few feet high. (Fig. 50.) The flowers are quite large, are softly shaded with purple, and present a conspicuous and unique appearance in spring, although the shrub itself does not possess a great deal of

Fig. 49.—*Chinese Magnolia Tree.*

beauty. It is usually propagated by layers or from stools, about two years being required for the young plants to become well rooted. It has in rare instances been obtained from seed. If grafted on our native Magnolia or the Cucumber tree, it would probably become more vigorous and present a finer appearance. It is not quite so hardy as the others, the tips of the shoots being occasionally injured by severe winters.

As these Magnolias bloom early or before the leaves expand, the flowers will present a more conspicuous appearance if planted in front of dark evergreen trees, the foliage of which will contrast finely with the flowers.

BARBERRY—Although not very showy, a desirable, ornamental shrub growing naturally in a handsome, symmetrical form, throwing out numerous racemes of rich yellow flowers early in summer, succeeded by bright

crimson berries which continue through autumn into winter. The purple, leaved variety has dark purple foliage, and is singular as well as beautiful. The barberry is increased by suckers and rapidly by seeds. (Fig. 51.)

Fig. 50.—*Purple Dwarf Magnolia.*

PHILADELPHUS.—There are two well known species, one of which, the *P. coronarius* or Mock Orange, without possessing much beauty, is esteemed for the fragrance of its flowers, which appear early in summer. The large-flowered, *P. grandiflorus*, is much more showy, having larger and clear white flowers, which appear two or three weeks later without possessing the fragrance of the other. A common but improper name applied to this genus is Syringa, the generic name of the lilac.

THE LILACS.—The common lilac, (*Syringa vulgaris*,) is one of the finest and most ornamental shrubs, but its hardiness and rapid self-propagation by suckers have rendered it so common that its merits are hardly appreciated. English and French cultivators have raised many new varieties; but they are rather variations than improvements on the common white and purple sorts. The Persian lilac, (*S. persica*,) is smaller and more graceful in form, and the panicles are longer and looser. There is a white variety, and another with finely cut leaves. The Siberian or Rouen lilac (fig. 52,) is a hybrid between the common and Persian, and is undoubtedly the finest of all, being larger and richer in appearance than the Persian, and more graceful in growth, and presenting larger masses of flowers than the common sort.

Fig. 51.—*Barberry.*

TARTARIAN HONEYSUCKLE, (*Xylosteum tartaricum.*) This is one of the most desirable of all shrubs, forming handsome compact bushes, with smooth or glossy leaves. When in bloom they are beautiful and showy objects, the red, pink or white flowers being numerously sprinkled among the dark green leaves. There are several varieties, passing in shade from pure white to light pink and red. The variety with striped flowers is one of the finest.

ROSE ACACIA, (*Robinia hispida.*) An old and well known large shrub, with racemes of rich deep pink pea-like blossoms, appearing about the

first of summer. (Fig. 53.) It increases rapidly by suckers, and the plants thus obtained having one-sided roots, tend to throw the stems in

Fig. 52.—*Siberian Lilac.*

Fig 53.—*Rose Acacia.*

an oblique position, which should be guarded against by root pruning and by staking until established. The beauty of this fine shrub depends much on preserving symmetry of form in its outline by timely pinching or pruning.

DOGWOOD, (*Cornus florida,*) is a large shrub becoming a small tree, remarkable for its large white flowers, (so called) which come out in spring about the time that the leaves expand. The flowers themselves are in small inconspicuous bunches, the broad white involucres which surround them and give to this shrub its showy appearance, being usually mistaken for the petals of the flowers. Being rather disposed to grow loose and spreading, the dogwood should be pinched into a more compact form, which will render it more suitable for the shrubbery. It is propagated by seeds.

THE RED-STEM DOGWOOD, (*C. alba,*) grows from four to six feet high, is distinguished by its white wax-like berries in autumn, and its bright crimson stems in winter. It is the latter which give it its ornamental character and add to the gay appearance of the grounds during the winter season. It is commonly found growing wild in swamps and wet places, and consequently flourishes best in deep moist soil.

HAWTHORN, *Crataegus oxycantha.*) The English hawthorn has produced many varieties, three of which, the double-white, the double-pink and single red, are ornamental in a high degree, blooming late in spring. They are propagated by budding and grafting on the common hawthorn. It is a large shrub finally becoming a small tree.

BUFFALO BERRY, (*Shepherdia argentea.*) The flowers of this large shrub are not conspicuous and present little beauty; but the profusion of light red berries which cover the branches in autumn, renders it quite or-

namental. It is rather irregular and straggling in growth, but if pruned, may be brought into proper shape. It is diœcious, or with stamens and pistils on separate plants, and the two must be planted near together in order to produce crops of the berries. These berries are pleasant to the taste and are valuable for culinary purposes. The plants are easily propagated by seed.

Fig. 54.—*Hop Tree.*

THE HOP TREE, (*Ptelea trifoliata.*) (Fig. 54.) A large shrub of handsome growth, bearing greenish flowers in summer, which have but little beauty but which are followed by a profusion of broad-winged seeds, which give it a curious and pleasing appearance. It is a native of this country, is hardy and is easily propagated by seeds.

SILVERBELL TREE, (*Halesia tetraptera.*) This is a handsome delicate shrub, finally becoming a small tree. (Fig. 55.) The flowers are white, drooping and in form quite similar to those of the snow drop. They are produced in great abundance along the shoots, and give the whole tree a highly ornamental appearance. It is propagated from seed which having a hard or horny covering, should be mixed with moist sand or earth as soon as ripe and not allowed to become dry. They often remain above a year in the ground before germinating. *H. diptera* is regarded as the finest species, but is much rarer and flowers more sparingly when young.

Fig. 55.—*Silverbell Tree.*

CORNELIAN CHERRY, (*Cornus mascula.*) A handsome symmetrical large shrub, which bears a profusion of fine yellow flowers early in spring before the expansion of the leaves. Later in the season the shining deep crimson fruit which is of an oblong shape, renders it an object of considerable ornament. The name, cornelian cherry, is derived from the beautiful

color of this fruit, which resembles that of the cornelian. When fully ripe and just before dropping, this fruit is pleasant to many palates. It is readily propagated by seed, which should be divested of the pulp and planted or mixed with damp earth before they become dry.

WHITE FRINGE TREE, *Chionanthus virginica.*) This is a large shrub not very showy, but much admired for its snow-white flowers, which resemble fringes cut from tissue paper, and contrast strongly with its broad, dark-green shining leaves. To succeed well, it should receive good cultivation in a deep moist soil. It blooms early in summer. It may be propagated slowly by layers but more readily from seeds.

SLOE, (*Prunus spinosa.*) This is the English wild plum or Sloe, also called Blackthorn from the color of its bark. It forms a large shrub and when trained to a single stem ultimately becomes a small tree. The double-white variety is the only one worthy of cultivation for ornament—its numerous double snow-white flowers giving it an exceedingly pretty appearance in spring. Being rather coarse and stiff in growth and liable to sucker, it should not be introduced into small shrubberies.

SNOWBALL, (*Viburnum opulus.*) A very common and well known large shrub, bearing large balls or rounded masses of white flowers, presenting a showy and brilliant appearance early in summer. It is often allowed to grow in a straggling form, but is greatly improved by training to a single short stem at the bottom, or in the form of a small tree; or else by pruning into a rounded mass, resting on the surface of the ground. It is propagated with great ease by layering the young shoots in spring, from which a profusion of roots will be thrown out by autumn, when the newly rooted plants are separated by means of the knife, and set out so as to assume a regular shape and upright position. It is a native of Europe and Asia, and is cultivated every where The snow-ball is often known by the improper name of guelder rose. There are three American species worthy of introduction into large collections. *Viburnum lantanoides*, has large showy leaves and handsome clusters of white flowers. *V. prunifolium* has smaller glossy leaves and less showy flowers, but the whole plant if well trained has a neat ornamental appearance. *V. oxycoccus*, or bush cranberry, is desirable for its clusters of crimson berries, continuing through autumn and winter. It should have a rich and rather mucky soil, and the shrub made to assume a dense compact form, with a single stem below, giving it great superiority in appearance over the meager and straggling bushes growing wild in swamps.

PURPLE FRINGE, (*Rhus cotinus.*) This handsome and curious shrub is known by a number of names, such as smoke bush, fuzz tree, Venetian sumach, &c. The purple fringes or airy plumes which give to this shrub its name, are composed of the slender hairy pedicles which remain and increase in length after flowering, at first of a greenish color, but afterwards becoming brownish-purple, and remaining from the latter part of summer into autumn. The shrub is often allowed to grow into an irregular form,

which may be easily prevented by pinching in when young, or pruning afterwards. It is easily propagated by layers.

LABURNUM OR GOLDEN CHAIN, (*Cytisus Laburnum.*) A large graceful shrub bearing long pendent racemes of golden-yellow flowers. It is somewhat tender at the extreme north. The Alpine or Scotch laburnum, (*C. alpinus,*) (fig. 56,) is larger and stronger in growth and rather hardier. The laburnums are propagated easily from seed.

JUDAS TREE OR RED-BUD, (*Cercis canadensis.*) (Fig. 57.) A small tree which can hardly be called a shrub, but which if pinched or pruned back as it should be to give it denseness of form and beauty of appearance, will be rendered very suitable for occupying the exterior portions of large shrubberies. Its beautiful purplish-pink blossoms appear in great profusion early in spring before the leaves, and render it one of the finest ornaments of early spring. It is easily propagated from seed.

Fig. 56.—*Scotch Laburnum.*

Fig. 57.—*Judas Tree or Red-bud.*

SERVICE-BERRY OR SHAD-BUSH, (*Amelanchior botryapium.*) A small tree frequently growing wild, and presenting a very ornamental appearance in spring, from its masses of white flowers which appear quite early or before the leaves expand—usually a few days before those of the apple and peach. It is well worthy a place in large shrubberies.

CLIMBING SHRUBS OR CREEPERS.

VIRGINIA CREEPER, (*Ampelopsis quinquefolia,*) called also Five-finger and American Ivy. The hardiness, rapidity of growth and richness of foliage of this plant, render it one of the most desirable among climbers. It grows wild throughout the country, and covers rocky cliffs and the trunks of large trees, often ascending to the height of sixty or seventy feet. Each leaf is composed of five leaflets, giving it a digitate or birds-foot form; whence the name five-finger. The form of the leaf serves to distinguish it at once from the *Rhus radicans* or Poison sumach with which

it is sometimes confounded by careless observers, as both plants often cover the trees in a similar manner. The Virginia creeper is not poisonous, being nearly allied to the grape and included under the same generic head by the older botanists. The leaves turn to a rich crimson in autumn. The tendrils fix themselves to the objects which support the stem by dilated sucker-like discs at their tips. Like the grape it is easily increased by layers and cuttings. On account of its hardiness it becomes an excellent substitute for the ivy, which is too tender to endure the winters in the more northern states.

PIPE-VINE OR DUTCHMAN'S PIPE, (*Aristolochia sipho* and *A. tomentosa.*) these two species much resemble each other, and form handsome, delicate climbing shrubs with broad, nearly round leaves. They are remarkable for the singular form of their flowers, which are tubular, crooked, and somewhat resemble a smoking pipe. They are propagated by layers.

TRUMPET CREEPER, (*Tecoma radicans—Bignonia* of older botanists.) This is a strong-growing climber, well known to ornamental planters in the northern states. (Fig. 58.) It is a native in Pennsylvania and further south. Its running stems are furnished with small rootlets by which it readily attaches itself to the bark of trees and brick walls. The flowers are trumpet-shaped, about three inches long and of a deep rich brownish crimson. It is quite hardy in the northern states, unless it be in the most severe winters; and is well adapted to covering walls and the sides of buildings, its dark-green foliage contrasting finely with the large rich-colored flowers.

Fig. 58.—*Trumpet Creeper.*

LARGE-FLOWERED TECOMA, (*T. grandiflora.*) (Fig. 59.) This is one of the most showy and magnificent of all our climbers, and like the common trumpet creeper, it has the habit of attaching itself to walls. While it is not quite so strong a grower and is less luxuriant in foliage, the flowers far exceed the former in brilliancy and splendor; they are usually about three inches in diameter, and a large number are often seen fully expanded on the same raceme. We have frequently seen these clusters a foot in length. An additional value is its lateness in flowering, commencing about midsummer and frequently continuing several weeks. The color is a rich-orange or orange-scarlet, marked inside with brighter streaks. It has but one drawback—it is not perfectly hardy in the more northern states. We have generally found it

advisable to detach it from its support on the approach of winter, and lay it on the ground where it may receive a light covering of leaves or evergreen boughs; or in places where much snow falls no covering will be necessary. Where the winters are not quite so severe, a covering of evergreens without laying down may be sufficient. We have known the plants to grow and flower without any protection, as far north as 43° of latitude, but they were lessened in luxuriance and beauty by the cold.

Fig. 59.—*Large Flowered Tecoma.*

The figures of both these species represent them about one-fourth the natural diameter. They are very easily propagated by layers.

PERIPLOCA.—A very hardy climber of strong growth, desirable for its dark rich foliage, rather than for its flowers, which are brown or purple. It is easily propagated by layers, and will rapidly cover any surface on which it is trained, or form festoons on supports or trees.

THE CLIMBLNG HONEYSUCKLES are among the finest ornaments of this class. The Scarlet Trumpet Honeysuckle, (*Lonicera sempervirens,*) is perhaps the most showy of all—its scarlet tubular flowers contrasting finely with its dark-green shining leaves, and continuing in bloom throughout the summer into autumn. When grown with the Yellow Trumpet Honeysuckle, (*L. flava,*) which much resembles it, except in its yellow flowers and lighter foliage, the two form a beautiful intermixture of colors. The Woodbine (*L. periclymenum,*) has pale-yellow flowers, which appear early in summer; remarkable for their fragrance. There are several varieties, one of which blooms all summer and another blossoms early in spring.

BITTERSWEET, (*Celastrus scandens,*) is a well known native climber, valued chiefly as a winter ornament—the orange-colored seed vessels bursting open and displaying brilliant crimson seeds. The flowers are white in panicled clusters and not remarkable for their show.

THE PRAIRIE ROSES are unexcelled by any other climber in the magnificence of their display when in bloom. There are many varieties, among the more commonly known of which, the Queen of the Prairies and Baltimore Belle, stand preeminent. When growing together and covering pil-

lars or other supports, the intermixture of white and red flowers forms a most brilliant display. The varieties known as Superba, Pallida and Perpetual Pink, as well as several others, are beautiful ornaments. The Ayrshire roses are luxuriant growers and great ramblers, but are not always perfectly hardy. Some of the Boursalts should not be omitted, for although not strictly climbers, they are vigorous growers, and may be trained to a considerable height on proper supports. Like the Prairie roses they form handsome pillars. The common purple Boursalt, which is so strong a grower and so hardy under all circumstances as to have become very widely known, is one of the finest of the whole class. We have counted more than two thousand blossoms on a single bush at a time.

CHINESE WISTARIA,* (*Wistaria chinensis.*) (Fig. 60.) Loudon says that this plant may be truly considered the most magnificent of all our hardy deciduous climbers. It is a native of China, and is sufficiently hardy to endure winters except in the extreme north. As far south as New-York city it flourishes finely. Its flowers, which are light purple, are borne on long drooping racemes, hundreds of which often grow on a single plant. It blooms during the first days of summer; but a second crop of blossoms may be freely obtained a month or two later, by taking off the leaves immediately after the first blooming and cutting back the shoots within a few inches of the old stem. New shoots are thrown out which produce the second blooming. The process may be again repeated and a third crop obtained early in autumn. This process is successfully performed only on well established plants; and if often repeated would probably injure their vigor. The Wistaria is easily propagated by layers or cuttings of the root.

Fig. 60.—*Chinese Wistaria.*

THE AMERICAN WISTARIA (fig. 61,) is less showy than the Chinese, and is distinguished from it by the darker purple of the flowers, and by the horizontal instead of drooping position of the racemes. It also flowers a month or two later. A new variety called the Magnifica, has been pro-

* Named from Dr. Wistar, but often misspelled Wisteria.

Fig. 61.—*Large American Wistaria.*

duced in France, which flowers more profusely, and which is represented in the above engraving at one-half the natural diameter.

EVERGREEN SHRUBS.

Most of the desirable evergreens cultivated in this country are trees and not shrubs. Many of them, however, may be easily kept in a small or compact shape by pinching or pruning back, not shearing. Among the evergreens that are strictly shrubs, one of the finest is the tree box, which, although growing quite slowly, or only a few inches annually, will ultimately attain a height of 10 or 12 feet. The trunk grows to a diameter of six or eight inches, and the wood is commonly used for wood engraving. It is mostly brought for this purpose from the east, and sells from twenty-five to seventy dollars a ton. The tree box has been much used for shearing into stiff and fantastic shapes. When allowed to assume its natural growth, it has less formality than most evergreens, and may be made into beautiful screens. The common box edging is a small variety of the same species. Both are propagated by cuttings and layers.

DWARF PINE, (*Pinus pumilio* or *P. montana.*) A European species, perfectly hardy in this country, and although growing with much vigor when young, never attains a height of more than ten or twelve feet, although spreading and forming a broad rounded mass of dense deep-green foliage.

THE COMMON JUNIPER, (*J. communis,*) grows four or five feet high, and if properly shaped when young, may be made to form a free handsome evergreen shrub. The Savin, (*J. sabina,*) as commonly seen is four or five feet high, with a straggling or spreading growth, but by training will grow higher and assume a better shape.

The Kalmias and Rhododendrons are strictly evergreen shrubs ; but as

they are cultivated for their brilliant display of flowers and not for their foliage, they have been placed under the head of other flowering shrubs.

CONTRIVANCES IN RURAL ECONOMY.

Bag-Holders.

FARMERS WHO HANDLE much grain and who cart off many hundred bushels annually, would find it a matter both of convenience and economy, to provide a simple stand to hold each bag while it is filled with the scoop shovel—instead of the more frequent practice of taking the time of a man or boy to do this work. These bag-holders are made in various ways. One mode is to drive a few sharp nails into the top of a light barrel open at both ends ; hitch the top of the bag on these nails while it hangs within the barrel resting on the floor with its mouth open ready for filling. When filled, it is tied and the barrel lifted off. A better way is to provide a board about a foot wide and eighteen inches long, (fig. 62,) which serves as a base, and on which

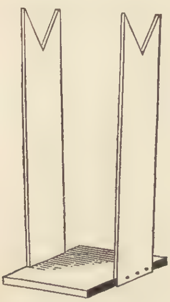


Fig. 62.—*Bag-holder of forked Boards.*

Fig. 63.—*Forked-stick Bag-holder.*

Fig. 64.—*Board Bag-holder.*

the bag stands. Uprights or standards with sharp points at the top hold the bag open until it is filled. These uprights are variously constructed. One mode is to take a piece of two inch plank for the bottom, and bore two holes or one at each corner on the same side, and insert upright or forked sticks firmly into these holes as shown in fig. 63. Another mode is to nail thin boards on the opposite sides of the plank base, sawing a fork in the top of each, so as to form sharp points for holding the mouth of the bag. If these boards are so nailed on to the base that they shall spread a little towards the top, and being thin enough to have some spring

to them, they may be slightly bent inward when the bag is attached, and springing out again will hold it the more firmly. One of the best, firmest and most convenient supports, admitting the ready removal of the filled bag, is represented in fig. 64. It has a board bottom, on two corners of which, upright boards are nailed as shown in the cut, connected and braced by a horizontal board at the top. Through this board are driven nails, projecting upwards and to which the bag is attached. This support is light and the uprights being braced, are not easily broken off. By first measuring the height of a full bag, the right dimensions may be obtained. (The cut is defective in not showing the top board cut away enough to let in the bag sufficiently.)

Snow-Plow.

The deep snow throughout the country the past winter, made a great deal of hard labor in shoveling by hand. A simple snow-plow may be made by any farmer in an hour or two, and will open paths by means of a single horse, with ease and rapidity. The height of a plow may vary with the depth of the snow, which being very uncertain, it should be sufficient. A foot will answer for nearly all cases. Take two pieces of plank or thick board a foot wide and about five feet long, more or less, dress off one end of each in a wedge form on one side, so that when these two dressed faces are placed together, the two pieces will diverge like a letter > (fig. 65.) A width of three feet behind will be usually sufficient, and a board may be placed within, extending across so as to form a brace by nailing. Sometimes a joint is made at the forward end and cross pieces of different lengths keyed in to make the plow wider or narrower as may be desired. A hook is attached to the forward end for the whiffletree, and a box seat placed on the top for the driver. By increasing or diminishing the distance between the hook and whiffletree, the forward end will run high or low as the nature of the snow may require. The driver has only to keep the horse in the right place, slightly guiding the plow by throwing his weight left or right. This plow may be used around the house, to front gate, to barns and other out buildings, along village streets and elsewhere. A finishing touch may be given to these paths by hand when desirable.

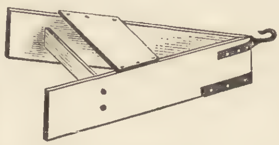


Fig. 65.—*Snow-Plow.*

Fastenings for Ox-Bows.

Every one who has yoked a pair of oxen has experienced the difficulty of holding up one end of a heavy yoke while inserting the bow and keying it in. The labor is much lessened by attaching a spring snap or catch to the bow, so that when simply thrust through the hole in the yoke, (fig. 66,) it fastens itself without any other attention. This is effected by inserting a large unannealed wire, so that it shall act on each side in a manner similar to the catch of an umbrella. A small iron plate with a

hole in it as large as the bow, should be secured to the top of the yoke for these springs to rest upon.

Fig. 66.—*Catch for Ox-Bow.*

Another mode of fastening the bow without employing a spring, is shown in fig. 67. A common butt or small door hinge is used for this purpose and is screwed on to the top of the yoke, so that its movable part may cover about one-fourth or one-fifth of the hole. A notch is cut into the bow to correspond with this projecting edge of the hinge. On inserting the bow, this half of the hinge is thrust upwards, but drops and secures it as soon as it reaches the notch.

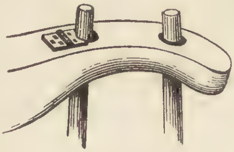


Fig. 67.—*Latch for Ox-Bow.*

Self-Shutting Gate.

Various contrivances have been resorted to, for causing gates to shut of their own accord. When they are large and heavy, this may be accomplished by hanging them, according to the mode described on page 278 of the second volume of Rural Affairs. In windy places, it is sometimes necessary to give additional force by means of a weight suspended to a cord, which runs over a wheel or pulley. For small or light gates we have never found anything equal to the spring represented in the accompanying figure. (Fig. 68.) One, which has been in use over ten years, appears to be as good as on the day it was put on. The different parts are shown more distinctly in fig. 69,

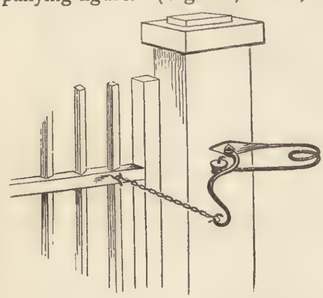


Fig. 68.—*Spring for Shutting Gate.*

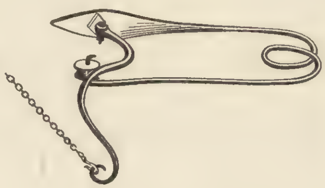


Fig. 69.—*The Same, enlarged.*

where *a* represents a spring which is screwed on to the gate in a horizontal position as is shown in fig. 68, having a small wheel at its outer end, in which the bent lever *b*, moves in opening and shutting. In the outer end of this lever a small chain is hooked, connecting with the gate. When opened, the spring is bent as shown by the dotted line. In constructing this contrivance, the great point is to form the curve in the lever, in such a manner that there shall be a continued and uniform pressure upon the

spring, at whatever distance the gate is opened. The form represented will nearly accomplish this purpose, its length being about equal to the distance between the post and small wheel on the end of the spring. This contrivance was patented many years ago and retailed at $1.50, the spring and lever being simply made of steel rod. The patent has probably long since expired.

Iron Gate Latch.

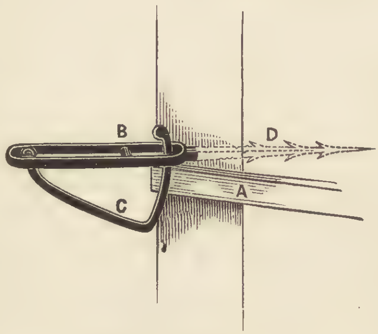


Fig. 70.—*Iron Gate Latch.*

A correspondent in Talbot county, Md., sends the following description of an iron gate latch, (fig. 70,) which he has found cannot be opened by mischievous mules or horses. The straight portion is made by bending a rod double and welding the ends to a sharp point, which is driven into the gate post D. The latch C, is of iron and plays in the space between the sides of this straight piece. The cross-pin at B. prevents the latch from flying entirely out, when the gate is shut forcibly. The gate is held shut by the pressure of the latch against cross-bar A, which may be a projection of the horizontal part of the gate, or a bar of oak, nailed or screwed to the stile.

Weeding Hoe.

A correspondent of the Country Gentleman, gives the following description of an efficient implement for cleaning crops of carrots, onions, &c. (Fig. 71.) Take about eighteen inches of pretty good old scythe, cut the back off, and five inches from each end, bend the blade up to a little more than a right-angle. Punch a couple of holes in each end and nail in a narrow head, six inches long. Put an old rake-stale in for a handle. The blade should stand about two inches outside of a right-angle from the handle. To use it—reach out about three feet and draw it towards you, letting it run about an inch deep. It will cut every thing clean and run close to the row. There is nothing like it for killing small weeds, and it will accomplish more than double the work of an ordinary hoe. If you have an old scythe, a


Fig. 71.—*Weeding Hoe.*

chisel and a punch, you can make one in an hour, and next summer when your onions, &c., get weedy you will not be sorry.

WITHDRAWING A CORK.

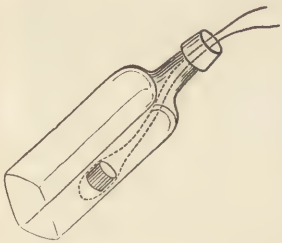


Fig. 72.—*Withdrawing Cork from Bottle by doubled Wire.*

The common operation of extracting by means of a corkscrew, the cork which has been firmly driven into the mouth of a bottle, is well known. Not unfrequently, however, they are driven entirely within the bottle, from which they are sometimes withdrawn by throwing the loop of a cord or thread around them. This, however, requires a good deal of dexterity as well as patience, and is not always successful. A much easier and better way, is to take a piece of quite small annealed wire, which should not be larger than the thirtieth of an inch in diameter—smaller would be better—make a loop just wide enough to hold the cork, and thrust this into the bottle and over the cork, which is then easily drawn out. (Fig. 72.) The spring of the wire will be sufficient to allow it to enter the mouth and yet take in the cork.

FASTENING OPEN BARN-DOORS.

Good barns are always supplied with fastenings to hold the doors while shut; but very few owners ever think of securing them while open, and as a consequence, strong winds often blow them about, slamming them against the walls or other obstructions, injuring or splitting them, and sometimes breaking them down from their hinges. Different modes are adopted for securing them while open. Doors which are merely fastened by a hook and staple, are easily fastened open by inserting another staple at the place where the edge of the door strikes, to receive the hook and hold it fast. Another mode, (described in the American Agriculturist,) is to prop the door open by means of a stick provided for the purpose an inch or more in diameter and three or four feet long, (fig. 73,) which is fastened to the outer edge of the door by an eye and staple, the other end resting horizontally in a hook when not in use. This end has a sharp iron point, to prevent it from slipping on the ground or ice. When the door is opened the stick is placed in the position of a prop by a single movement of the hand; and when

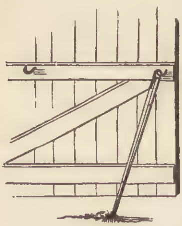


Fig. 73.—*Propping open Barn Door.*

Fig. 74.—*Fastening open Barn Door.*

again shut, it is lifted and laid in the hook. A third mode, which may be adopted where a common latch is used on the door, is to place a second catch at the outer edge of the door, which may receive and hold the latch while the door is open. This is better or easier to manage than either of the others, the latch being self-fastening in both positions.

Simple Farm Gate.

A correspondent of the Country Gentleman, sends a description of a simple farm gate which we have represented in figs. 75 and 76. It has no hinges, but operates like a set of bars, with the exception that the bars are all fastened together as in one piece, made light enough to handle readily and to be removed at a single operation.

Fig. 75.

Fig. 76.

Such a gate never gets open by swinging, nor out of order by sagging. Each end of the fence at the opening is finished as in fig. 75, the extra post being placed at one side from the other at a distance of a little more than the thickness of the boards—each end being on opposite sides of the post. The short cross-pieces hold up the ends of the gate. The gate is first placed where it is wanted and these cross-pieces are then nailed under the projecting ends of the boards. To open the gate, push it back a little and swing it around as far as at right-angles, if desired, or remove it altogether.

Bin for Coal.

House cellars which have smooth floors of hydraulic cement, as all such cellars should have, are often disfigured by the loose coal, which is thrown in a heap upon them,and often scattered about loosely, in a general way. Neat housekeepers use large boxes or bins for the coal, (fig. 77,) which is shoveled out with considerable inconvenience, at the top. A better way is to place the coal in a large box or bin, having an opening at the bottom, ten inches or a foot wide and several inches high, varying with the size of the coal, which at this place rests upon the floor. It is thus easily shoveled up into the scuttle, or into the hot-air furnace in the same apartment. As fast as the coal is thus removed a fresh supply falls down from above until the bin is exhausted.

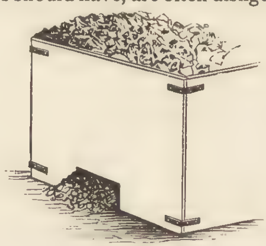


Fig. 77.—*Coal Bin.*

Shovel for Coal.

Fig. 78.—*Coal Shovel.*

A good shovel for filling coal scuttles or furnaces, (fig. 78,) is made by taking a common iron or steel scoop shovel to a blacksmith, who will bend up the sides at right-angles to the bottom, of such a width as will be suitable for filling the scuttle or passing the furnace door.

Door-Fastening.

Travellers who stop at third-rate hotels often find their lodging rooms destitute of locks. The following simple fastening may be carried in their travelling bags, and will secure them from intrusion during the night. Take a piece of large wire about four or five inches long, bend it in a loop like the letter U, but narrower, then heating the points red-hot, bend them at right-angles, and flatten the points like sharp wedges—the whole being similar to the form represented in fig. 79. In fastening the door, place the sharpened points of this loop against the door-post or frame, and then by slamming the door slightly against it, the points will be driven in and hold it fast. It should be so placed that the loop may project about half an inch into the room; then take a short piece of iron and thrust it through the loop as shown in fig. 80. This iron will extend across both door-frame and door, and prevent the latter from being opened while it remains in the loop. There is usually space enough between any door and the door-post for the wire loop. A small bar of strong wood will answer as well as iron, if the loop is large enough. Instead of wire, a piece of thick sheet iron, or still better, a thin plate of steel, may be bent as shown in fig. 79, with a hole through the end for receiving the bolt—which may be a large nail, if nothing else is at hand.

Fig. 79.—*Door-Fastening.*

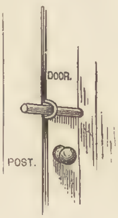


Fig. 80.—*Door-Fastening.*

Sharp Feet for Ladders.

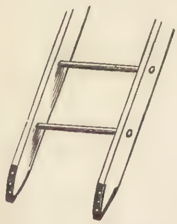


Fig. 81.—*Sharp Feet of Ladder.*

Ladders are nearly always made with blunt, rounded, or square ends; and as a consequence, when placed upon a smooth surface, especially if frozen or icy, there is danger of their slipping or falling. The lower ends should always be sharp or wedge form, (fig. 81.) If much used, they should be shod with iron—the simplest mode of doing which, is to take an iron strap, bend it, by heating in the fire or forge, to a sharp angle in the middle, so as to fit the wedge form of the feet, and then nail it on through holes punched for the purpose.

THISTLE DIGGER.

X. A. Willard describes in the COUNTRY GENTLEMAN, a useful implement much used in England, for extirpating thistles and similar weeds from grass lands. It is easily made, cheap and lasting. A. (fig. 82.) is the handle; B. the claws, between which the thistle is received; the curved iron C, is the fulcrum by means of which a purchase is obtained for extracting the root. D. is an iron rod or bar, upon which the foot is placed to thrust the claws into the ground. In case the root of the thistle breaks, while endeavoring to extract it, the implement is inverted and the curved blade E, which has a chisel-like end, is thrust into the ground in order to cut off the root some inches from the surface, and thus prevent it from vegetating. When the ground is a little moist or loose, this implement, in the hands of an active man, will take out a large number of plants. It makes sure work, and when the land is not overrun with the weed, it is the cheapest way to get rid of it. Boys like the sport of prying up the plants, and the implement should be made light and handy, so as to give them a play at "the thistle business," whenever they feel inclined.

Fig. 82.—*Thistle Digger.*

A HORSE CLEANER.

In muddy weather, the legs and bodies of horses frequently become covered and encrusted with the hardened mud, which, for the comfort of the animal as well as decent appearance, should be scraped off and the hair brushed clean, dry and smooth. A currycomb is too harsh a tool for scraping off the mud, especially around the angular parts of the legs. A much better thing is a very cheap and simple scraper, made for the purpose, either of wood or sheet iron, and which has been in use many years. Fig. 83 represents a wooden one, which may be made of a thin piece of hard board or the stave of a barrel. One end is rounded so as to be held comfortably in the hand, and the other sloped to an edge. Fig. 84 is a sheet-iron scraper, which is quickly made by any tinker. It is similar in form to the other, but a portion is rolled up at one end to form a handle. In addition to scraping off mud, this sheet-iron blade is useful in hot weather for removing perspiration from the horse's back and sides.

Fig. 83.—*Wood Horse-cleaner.*

Fig. 84.—*Sheet-iron Horse-cleaner.*

Horses Drawing on the Halter.

Various contrivances have been made to prevent horses from pulling at the post; some of which by producing pain and subsequent soreness on the top of the head, effect permanent injury to the animal. A better way is to use the following contrivance, (fig. 85,) which by pinching the jaw and pressing the mouth closely together, is very apt to cause the animal instantly to desist. Instead of connecting the two side rings of a common halter, by a third strap to which the long strap is fastened, let these side rings be connected by a strong flexible cord, as shown in the accompanying figure, and fasten the hitching strap to the outer part. Whenever the horse pulls at his halter, the inner part of the cord is drawn forcibly against his jaw, and the powerful tourniquet movement is rather more severe than the animal is willing, voluntarily, to endure. A strap is sometimes used instead of a cord, but it is less decisive and efficient.

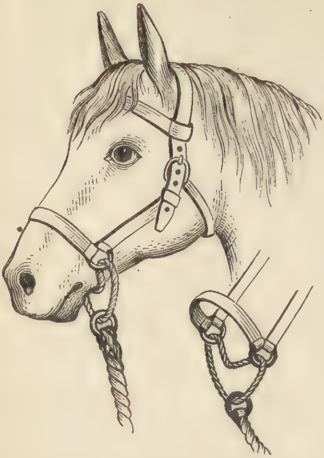


Fig. 85.—*Halter for Pulling-horses.*

Propping Stacks.

A well and evenly built stack of hay, straw or cornstalks, will keep its place and stand perfectly erect. But bunglers often build stacks which settle to one side—a result which is almost sure to occur if the load is always driven on the same side in building; or if the builder is not careful to place regular tiers of forkfulls, while he ascends, like the tiers of brick in building an edifice. Stacks made in this way in a short time begin to nod, and make obeisance in some particular direction; and the next step is to thrust rails, in the form of props, against the lower side, to prevent further settling or upsetting. The points of these punch into the stack and very little good is done. A better way, well-known to some of our readers, is first to place a plank, slab or broad rail, against the side of the stack, against which the prop may be set, (fig. 86.) A slight notch may be cut, to prevent sliding. One prop thus inserted, is worth half a dozen placed in the common way.

Fig. 86.—*Propping Badly-built Stack.*

Wood Carrier.

A correspondent sends us a description of a frame or barrow for conveying wood by hand from the wood-house to the fire. It obviates the necessity of piling the sticks on the arm, one by one, and then carrying them into the house, the wood being placed at once upon the frame where it is not lifted until the frame is filled, (fig. 87.) When wood has been dusted or covered with snow, it is easily knocked off by striking two sticks together before placing upon the frame. It is made in a manner quite similar to the common saw-buck, the sides being not quite so wide apart and longer above the round that holds them together. It consists of four strips of hard wood, one inch thick, four inches wide, and four feet long—crossed eighteen inches from the lower ends, nailed and clenched with wrought nails. An auger-hole, an inch and a fourth in diameter, is bored through at the crossings and a round connecting rod, fifteen inches long, inserted.

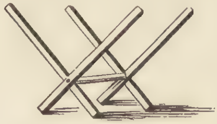


Fig. 87.—*Wood Carrier.*

Drawing out Old Posts.

When an old fence or gate-way is to be removed, it is often quite a task to draw the old posts from the ground. The common way is to dig away the earth for a foot or two downward, and then pass a chain around the post and around a stout rail or a large lever, which is used for drawing out the post. In some instances the insertion of the point of a crowbar into the side of a post is sufficient for lifting it. Both these modes are slow; a more easy and rapid one, using ox power instead of human strength, which has long been in use in some places, is to attach a sufficient amount of chain to the oxen at one end and to the post at the other, place a stout prop between with its top inclining towards the post, and then let the animals draw—(fig. 88.)

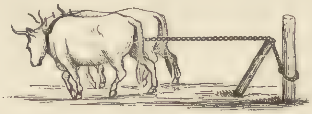


Fig. 88.—*Drawing Posts.*

Sagging Doors.

When a new house is built, the doors commonly work well for a time, or in the words of the owner, "they shut beautifully." As time elapses, one of them begins to strike the sill at the outer corner; another "gets stuck" against the lintel; a third strikes the side piece, and a fourth cannot be shut at all. The various slammings, pullings, jerkings, and vain or difficult efforts to open or shut the door, twist, crack or injure it, deranging the knob or lock, and rattle down the adjacent plastering. The carpenter is called in, and by sawing or planing off the painted edge, succeeds in effecting a remedy for the present time. In nearly all such instances, either the building has settled out of shape, or the hinges have

become worn or loosened. When the latter is the case, some times a slight replacement or even screwing up of the hinge will answer the purpose. If the iron on which the hinge turns has been worn small, a remedy may be applied in the form of a small washer, which may be a tube of tin or thin sheet-iron slipped over it. If the building has settled, (and a very slight settling will derange all the doors,) the use of a jack-screw with thin hard wood wedges, may be made to remove all the difficulty.

When a door sticks against the base or lintel, the difficulty of opening and shutting may be removed temporarily, by pressing firmly on the door knob in the direction *from the adhering part.* For instance if the door sticks at the top, press downwards—if at the bottom, lift upwards,—and it may be readily opened or as readily shut.

Corn-Markers.

The Prairie Farmer describes a corn-marker which appears to have much to recommend it, to the description of which we add the accompanying cut. (Fig. 89.)

It is made by putting a short axle in the forward wheels of a wagon, and a long one in the hind ones; couple them together by a six feet stick pinned on to the center of each axle, with two braces pinned on the hind axle, and running to the center of the coupling; the wagon tongue can be put on the front axle by two small iron bolts put through the ends of the hounds and axle; the axles can be made of poles. Put the front wheels four feet apart, and the others twelve feet, though the length of the axle can be made to suit. Sixty acres in a day can be marked with it. It runs light, and makes a good mark, and one that will show after a rain as good as a sled mark.

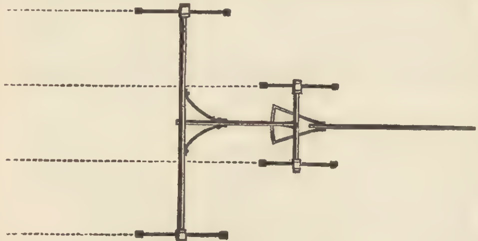


Fig. 89.—*Corn-Marker.*

Hand Glass.—A cheap hand glass is made by taking strips of board three inches wide, run the match plane, that makes the groove, near one edge, saw to such lengths as when nailed together in the form of a parallelogram, it will just admit a pane of glass to slide in the grooves. One end should be lowered to admit the glass to slide over it. When not in use the glass can be taken out and put away. By their use the plants may be easily ventilated by sliding the glass, more or less, according to the temperature. The glass should be at least 8 by 10 inches; larger would be better.—*Rural N. Yorker.*

IRON FURNITURE FOR FARMS.

THE IMPROVEMENT which has been made in various kinds of farm fixtures and furniture of late years, is one of the distinct marks of modern progress. A cast-iron pig-trough, or iron manger, for example, will outlast a dozen made of wood, never need repairs, and are not liable to be gnawed and spoiled by animals. On this account they may be regarded as the most economical. Cast-iron cistern and well pumps work more easily and satisfactorily than the old heavy wooden ones, and are made and sold at low prices. There are several extensive manufactories of this iron furniture in different parts of the country—among which Cowing & Co., and Downs & Co., of Seneca Falls, N. Y., and J. D. West & Co., New-York city, are conspicuous. Cowing & Co. have kindly furnished us with the several cuts for this article. As frequent inquiries are made, we shall doubtless render an acceptable service to our readers, by making them better acquainted with some of these iron articles, and inducing them to procure those superior to what they may have in some instances before possessed.

PUMPS.—These are made of various forms, and for a large number of different purposes. Fig. 90 is an iron cistern-pump, showing the mode of bolting it to the floor or platform, and representing also

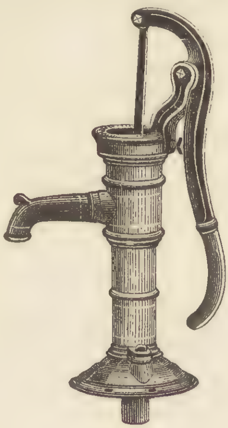


Fig. 90.

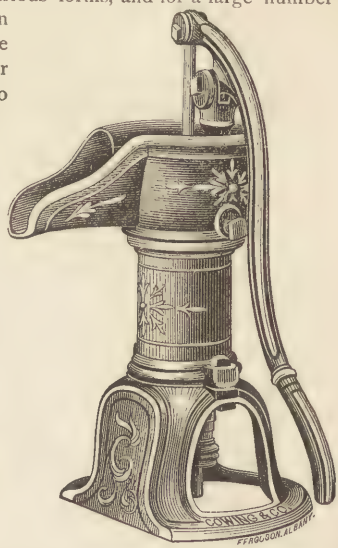


Fig. 91.

their neat and compact form, occupying but little space at one side or in the corner of a kitchen over the cistern. Fig. 91 exhibits a new pump, of

much simplicity and convenience, as we have proved by a full trial. The base is strongly braced, and yet is so short under the spout, that the water is delivered in the center of the pail, and dripping or slopping over the edge of the pail entirely prevented. The ease and rapidity with which it lifts and throws water, we have never found excelled. It is furnished with a contrivance for letting off the water from the tube at pleasure, to prevent freezing.

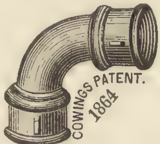


Fig. 93.

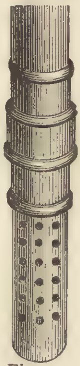


Fig. 92.

Fig. 94.

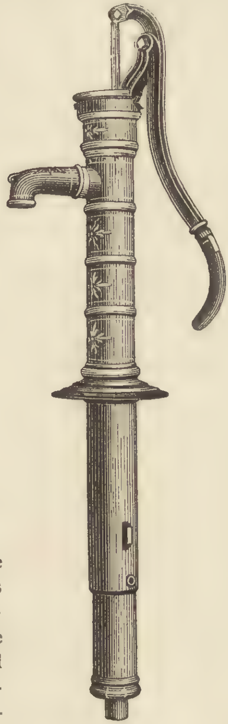


Fig. 95.

Although all the working parts of these pumps are made of iron, yet experience has proved that the cheapest, best and most satisfactory material for the tube, is wood. The Tulip tree or "White-wood," is found well adapted to this purpose, and is used by Cowing & Co. When on a visit at their establishment, we found a lathe in operation of their own invention, which rendered three inch square scantling round and smooth, at the rate of eight feet in length per minute, the only attendance required being to lay the wood on the machine, and remove it when finished. It was then placed on another machine which bored these round sticks with accuracy and finish, at the rate of nine feet per minute—the chips flying out of the end, like chaff from the fanning mill. These wooden tubes are connected by means of iron couplings, which are shown in figs. 92 and

93. Fig. 94 shows a cast-iron foot valve, with strainer. Fig. 95 represents a cistern or well pump, so constructed that the working parts are about 20 inches below the platform or base of the pump, and are therefore well adapted for out-door work. If the well or cistern is kept covered tight, the pump will not freeze below the platform. They will succeed in any well not over twenty feet deep, and by means of their various couplings may be made to draw water in a horizontal or inclined position, provided the whole height is not much over twenty feet.

Another form, is the engine well pump, adapted to deep wells and is made by combining the principles of atmospheric pressure, or suction, with the force pump, and having an air-chamber connected, will throw a constant stream. It is adapted to not only the ordinary uses of a well pump, but also to the washing of windows, buildings and vehicles, and the extinguishing of fires. With three feet of hose and a discharge-pipe, water can be easily thrown over a two-story building, or with sufficient hose, carried over the entire premises.

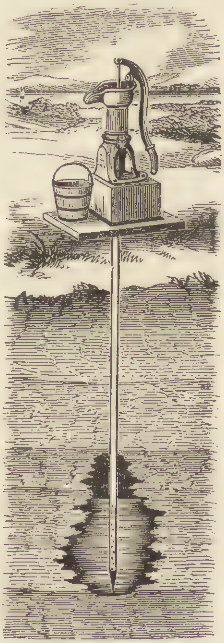


Fig. 96.

Fig. 96 represents the new mode of making wells by simply driving into the earth common iron gas-pipe, pointed at the lower end, and perforated at the sides near the lower extremity for the ingress of water—thus obviating entirely the cost and labor of digging wells. If driven through a subterranean spring, stratum of water, or a wet layer of sand or gravel, it is obvious that the water will immediately flow through the perforations into the pipe; and by attaching a good pump to the pipe, and pumping for a time, all the particles of sand and fine gravel will be drawn out, and the cavity thus formed around the perforations will remain filled with pure water. These tubes and pumps are admirably adapted to localities where large beds of wet gravel exist fifteen or twenty-five feet below; and in fact to all soils where large stones are not abundant. Where these occur, the pipe must be withdrawn and tried in a new place, until success is attained.

An excellent deep well pump is represented by fig. 97—the working part being placed at the bottom of the well, is adapted to any depth of water, the rod working safely within the cylinder. The lower part of the cylinder is furnished with a strainer which is plugged at the bottom to prevent the

ingress of sand and mud. The connecting pipe between the cylinder at the bottom and the standard at the top, is wrought or galvanized iron. The pump of course needs bracing to prevent swinging when worked.

OTHER IRON ARTICLES.—A clothes-line reel is shown in fig. 98, the arms being made of wood and inserted after the cast-iron or central part has reached its destination. The tight square cap, immediately below the reel, fits upon the top of a post set out of doors, conveniently accessible to the wash-room.

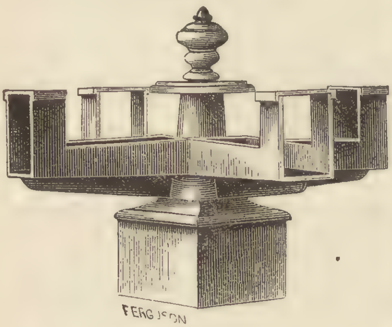


Fig. 98.

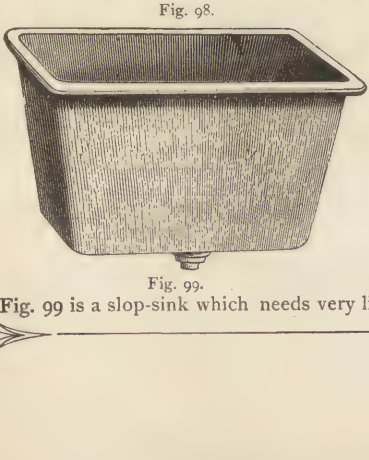


Fig. 99.


Fig. 97.

Fig. 99 is a slop-sink which needs very little explanation. It will hold

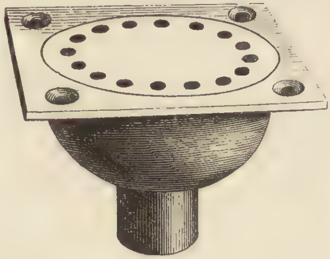


Fig. 100.

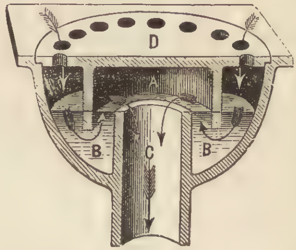


Fig. 101.

a common sized tub of water, and is furnished with a strainer and cess-pool, forming a safety-valve to the drain when set upon it. Figs. 100 and 101 represent the bell-traps alluded to, which prevent the entrance of impure gases or nausious aflluvia into dwellings from sewers or drains. Fig. 101 is a section showing the structure of different parts. The inverted bell A. comes below the top of the tube C. into the water B. and thus entirely confines the gas in the top of the inverted bell A. The arrows show the course of the water through the trap into the sewer or drain.

Fig. 102.

Cast-iron jack-screws, shown in fig. 102, are useful for many purposes, such as raising the corners or sides of buildings which have settled out of place, in renewing the under-pinning, &c. The nuts to these screws are made so as to let into a wooden block or timber.

Quantity of Hay consumed by Cattle.—The following careful estimate, by a correspondent of the Country Gentleman, which nearly accords with other experiments, will enable farmers to determine before hand, the amount of hay their stock will consume during a winter: On the 3d of Jan. last, I drew a stack of timothy, blue or June grass, and white clover hay. The top of the stack, 500 lbs., was put in racks in the cattle-yard, and 7,990 lbs. into the loft of the cow-stable. This hay was given to the cattle for the first time at 4 P. M. on the 3d, and the last of it was fed at 7 A. M. on the 14th of Jan. That in the racks was gone by the 10th of Jan. The stock was 22 cows and heifers, and 11 yearlings. The esimated weight of the stock was 26.000 lbs. The 33 head consumed per day, 772 lbs., equal to 23 4-10ths lbs. each. Each 100 lbs. of live weight consumed 32 65-100th lbs, during the 11 days, equal to 2.96 lbs. per day. Two of the cows were in milk, and were fed two quarts of grain each, in addition. The cows average 1,000 lbs.; consequently they consumed nearly 30 lbs. of hay each per day. The heifers are two and three years old, and weigh 800 lbs. each. They consumed 23 68-100th lbs. each per day. The yearlings 600 lbs. each, and consumed 17 76-100th lbs. each per day.

STONE AND GRAVEL ROADS.

WE HAVE URGED on former occasions, the importance of constructing roads of uniformly hard materials, instead of soft earth or muck. The former, if well made, will furnish a fine, smooth, hard track, in all weather; the latter will be cut into mud-holes and ruts from six inches to two feet deep; and sometimes prove nearly impassable. When hard and soft materials are crudely mixed together, as we sometimes witness where large stones are thrown into heaps of muck, the mixture becomes intolerable.

Could we see the immense assemblage of broken and worn-out wagons, mud splashed, injured and broken harness, and sprained and lame horses, (enough to fill any ten acre lot,) which the bad roads throughout the country annually occasion, a strong impetus would certainly be given towards improvement.

Where a uniform, solid hard-pan is found a few inches below the surface, or even at the depth of a foot or so, the cheapest way to make a good road is to scrape or cart the soft top soil to manure the adjacent fields, and then make the denuded surface into a smooth track. But where this cannot be done, an artificial road, made of broken stone or gravel, is usually resorted to. A very common practice is to draw the loose and scattered stones from the fields to form a bed of proper width, and then cover this with gravel; or if gravel cannot be had, with earth. A section of a portion of such road is shown in fig. 103. The stone are heaped up and spread over the surface irregularly, and then a sufficient depth of gravel or earth is placed upon them, to make a uniform surface. This seems to promise well for a time, until the hard corners of the stones, gradually working through the soil or gravel, make it uneven. The jolting of the wheels then begins to loosen the stones more rapidly—many of them work upwards and become partly uncovered; the gravel falls below, and in the course of years the road becomes excessively rough, as shown in fig. 104.

Fig. 103.—*Badly made Stone and Gravel Road.*

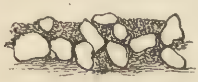


Fig. 104.—*Result in after Years.*

Some years ago a road was carefully constructed at great expense, by first making the foundation of block stone or very thick flagging. On this a coating of gravel was placed, giving it a handsome finish; (fig. 105.) For a time it promised everything that was desired. But three combined causes soon began to operate to injure it. When the earth below became soaked with water, it was too soft to sustain the superstructure. The action of frost increased the difficulty, and the tumbling of heavy wheels above gradually jolted the blocks from their

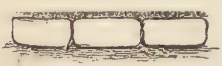


Fig. 105.—*Block Road.*

places. In the course of years the solid bed of block stone became entirely broken up, and some of them were turned on edge, as shown in fig. 106.

Now the question will at once arise, how are these formidable evils to be remedied? There are two ways—one is expensive, the other comparatively cheap. The first is the McAdam road—formed of a deep bed of small broken and angular stones—which, by the rolling of wheels, becomes compacted and cemented together, and forms a solid immovable mass. This road requires a large expenditure of money to construct properly. Many poor ones are made, which do not deserve the name. The other road is the Telford. By using the larger portion of the stones unbroken, much expense is saved. By arranging them as shown in fig. 107, they are held to their places, and do not work to the surface as exhibited in fig. 103. All the rounded and loose stone which are found scattered over farms, (which are better for their removal,) may be used for constructing Telford roads. As none of them are absolutely spherical, and nearly all have a thin and a thick end, being somewhat wedge-shaped, the larger end is placed downward, and the smaller upward, as represented. By selecting them according to their size, the larger ones may be placed in the center of the road, and the smaller ones, by gradual diminution, towards the sides. Coarse gravel, or what is still better, small broken stone, is then rammed between them. The whole surface is then covered with similar but finer material, and the road is finished, as shown in fig. 108. When loaded vehicles are driven over this road, every successive wheel crowds the broken stone more firmly between the stone wedges, and the whole becomes a solid and immovable mass. It is impossible for the stones to work to the surface, the larger ends being down.

Fig. 106.—*Final Result.*

Fig. 107.—*Portion of Telford Road.*

Fig. 108.—*Section of Telford Road.*

If those who employ stone for making road beds, would take the additional care to select and place the stones in this way, instead of throwing them into a careless and promiscuous heap, it would ultimately result in great economy.

Transplanting Raspberries and Blackberries.—For the past two years, says the Horticulturist, we have annually planted out Raspberry and Blackberry plants in July. We prepare our ground, and then go to the rows from which to remove the plants, having a tub or pail with a little muddy water in it, dig our plants, they being the half grown ones of this year, pinch off the ends about 2 inches, set the roots into our pail of muddy water, and from that to their permanent position. We do not often lose a plant, and the next season we get a fair crop of fruit.

CONSTRUCTION OF HAY BARRACKS.

THE OLD FASHIONED BARRACK, as it is called, is built twenty feet square. Four posts of durable timber, twenty-two feet long, four feet to be inserted in the ground. The stick should be sufficiently large to square eight inches—the corners hewn off, making it partly octagon in shape—one and a half inch holes should be bored through the corners of each of these posts, one foot apart, for the bolts that support the roof. They should be made of one and a half inch iron, one foot in length, the outer four inches to be squared and turned up one inch, on which is laid a piece of joist, three feet long, to support the roof. The roof should run to a point from each side, and may be covered with shingle, tin, or thatched with straw.

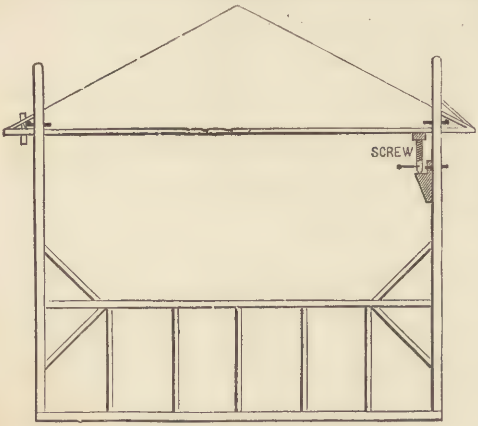


Fig. 109.—*Hay Barrack.*

There are four plates framed together, and braced. The posts pass up through the roof on the inside corners of the plates. The roof is elevated and lowered with a small screw of wood or iron, about two feet long. A wooden screw three inches in diameter will answer. This is used on the inside of the post. One man can raise and lower the roof if it is done as fast as the hay is put in or taken out. Raise each corner of the roof one foot at a time, going regularly around the barrack. The roof will not be likely to blow off, if the above directions are followed in building. The posts, as far as they enter the ground, may be left the full size of the stick.

The best way to build a barrack, is with sills and girts seven feet from the sills, and braced. You can fill it from the ground or hay-poles on the girts, and have shelter under for sheep or cattle. I make a rough sketch of a frame barrack, side view, which is given above.—*J. D. K. in Co. Gent.*

Leaves are the lungs of plants. Probably more than half the food of plants enters the leaves in the form of an invisible gas.

PLAN OF A CORN-HOUSE.

I GIVE YOU a rough sketch of a corn house we built three years ago, and there has not been a rat or mouse in it yet. You will see it is not connected at the bottom—consequently use the gravel for a floor to drive in on—the only way a crib can be built rat and mouse proof. It stands on eight pillars, four on each side. They are eight inches diameter, two feet ten inches long, sixteen inches upper end is tinned—standing on stone blocks two feet square by six inches thick. On top of each post are saddles. It stands as firm as if it were on a wall. The ends are boarded up and down, with small rib slats over each crack. The sides are covered with slats two and a half inches wide, with three-quarter inch cracks. They are put on up and down from the projection to the under corner of the sill. Inside slats run the other way, horizontal. There is a door in the centre of each crib, made of slats, to put corn in, to the depth of five feet. Then it is handed up from the wagon through the scuttle in the centre of the upper floor, which is laid with slats except one end nine feet square, which is a tile floor for a bin to hold shelled corn. The cribs extend up to the roof, with three doors to empty the corn, (three on each side.) Stairs hung with a hinge so as to swing up and fasten; when down the lower end rests on the walk. We cribbed two years ago, eighteen hundred bushels of ears in this corn-house.—*A. K. H. in Co. Gent.*

Fig. 110.—*Corn-House.*

Fig. 111.

POSITION OF FLOWER-BEDS.—It often happens that two different flower-beds may be equally well managed and flourish alike, yet one may be a mass of brilliancy while the other exhibits little or no beauty. There are many flowers which always face the light of the sun; consequently the beds should be so placed that the spectator in the walk or window, should look them *full in the face.* That is, the strongest light and the position of the spectator should always be on the same side of the bed. This will be found particularly necessary with the pansy or tri-colored violet, and some other of the smaller flowering plants.—*Rural N. Yorker.*

ORDER AND SYSTEM.

A WELL CONDUCTED FARM is a beautiful machine. We have seen a steam-engine of fifty horse power, that ran with such perfection that it could not be heard at a distance of twenty feet. We have heard some, much smaller, that gave out a mixed jargon of thumps, rattling of iron, and rushing of steam. At a celebrated trial of agricultural machines, there were two mowers—one could be heard nearly a mile—the other scarcely more than a few rods, and the cutters went through the grass like a hot knife through butter. There were likewise two threshers—one was huge and ponderous, and when in motion trembled throughout, with a noise somewhat like thunder. The other, a two horse tread machine, ran so perfectly that nothing could be heard at ten paces, but the tread of the horses' feet on the rolling platform, and the whistle of the grain and straw as they were shot from the cylinder.

It is precisely so with the machinery of a farm. If well conducted, every part will move on noiselessly but efficiently—all will be promptly done in its season; there will be no confusion, and a great deal will be accomplished. A badly managed farm, on the contrary, if not wholly neglected, will be hurry and disorder, with every thing out of joint, and very little will be done. The farm is a complex machine; and like all other machines made up of many parts, must be perfect at all times, or one small part will suspend the motion of all the rest. A broken cog, a missing bolt, or a bent axle, will derange the whole.

To come somewhat to particulars: The farmer must know at the start what he is going to do. His yearly operations must be distinctly before him. It will not be profitable for him to stop and consider and plan, after a piece of work is partly executed. He must begin at the beginning—must have his fields well laid out—his rotation digested—and the extent of each crop prescribed. If he is a practical farmer he will of course know how much time will be required for the preparation of the land, sowing, cultivating, and harvesting each crop,—to which estimates he should add at least two-fifths for the interruptions of rainy weather and other contingencies. This will prevent him from undertaking too much, which is, next to laziness, the most fruitful cause of all bad farming; of hurried operations and undestroyed weeds.

There are two great requisites in all successful husbandry,—to make the best use of all spare moments; and to be always ready in advance for every emergency. These two essentials work together, for by properly using the spare moments, ample preparations may be made. Slip-shod farmers are too much like the man with a leaky roof; in fine weather no repair was needed, and in rainy he could not do it. It may perhaps be laid down as a universal truth, that success in all enterprises depends on being able to predict beforehand what will be wanted. The need of a

single tool in haying time, may result in arresting the labor of ten men, and in the loss of ten tons of hay by an approaching storm. The want of good implements of tillage may delay the sowing of a crop, till rains may postpone the operations a fortnight. "For want of a nail the shoe was lost, for want of a shoe the horse was lost."

A workshop with tools is indispensable for every farm. The owner should supply himself with a complete list of all implements. A place should be provided for every one, and every one should be in its place; and on every rainy or stormy day, an examination should be made and repairs promptly performed. Tools should be kept constantly in order, as a standing rule, and not be left broken till wanted for use. This is still more important, if they are to be sent to the village mechanic; for if taken in time the errand may cost much less than to wait till the moment required for actual use, and then to take a horse from a plow or from a hay wagon, to send three miles for a trifling but necessary repair.

In order to be able to accomplish farm labor promptly and in season, teams must be healthy and in the best working order. To be healthy, they should be fed with great regularity and uniformity, whether working or not, with good wholesome food and not with musty hay and grain or short pasturage. Their apartments must be clean and pure, and they themselves well curried. Some farmers lose much by giving their horses more work than they can perform comfortably—they are consequently worked too hard, enfeebled and made poor, and prematurely worn out. Not being supplied with sufficient animal force, favorable chances are lost and work allowed to accumulate, and increased labor will be required for its performance, and a waste result from delay. An extra working animal partly pays its way in manure, and sometimes its whole yearly keeping is returned in increased crops from early seeding and prompt cultivation.

Every farmer should carry a memorandum book. It is his compass and log-book combined. A page for each week, by way of assisting the memory, laying out every thing clearly before the eye, and for recording the numerous suggestions for future experiments, which must constantly occur in practice, would prove invaluable another year, and in ten years would develop an inexhaustible fund of facts.

FEEDING VALUES OF GRAIN, ETC.—In answer to an inquiry, the editor of the Irish Farmer's Gazette states that "45 lbs. wheat are equal to 54 lbs. barley, 59 lbs. oats, 54 lbs. rye, 57 lbs. Indian corn, 69 lbs. linseed-cake, 374 lbs. wheat straw, 195 lbs. oat straw, 100 lbs. hay, 276 lbs. carrots, 504 lbs. common turnips, 350 lbs. swedes, 339 lbs. mangels." A table given in Vol. 3d of RURAL AFFAIRS (p. 226) does not differ very widely from these figures, giving for example, 43 lbs. wheat as equal to 56 of Indian corn, 59 of oats, 46 of beans, &c. Farmers in some parts of England are now feeding wheat to their cattle in considerable quantities, as it is relatively cheaper than other material, and the foregoing statement may enable some of our farmers to judge whether they can judiciously follow the example. Meantime have any of our readers tried feeding wheat?—*Co. Gent.*

REMEDIES FOR HOUSEHOLD PESTS.

RATS.—Dr. Godman, the eminent naturalist, says that the rat is one of the veriest scoundrels in the brute creation—occupying the same rank as the crow does among birds—adding that "he is one of the most impudent, troublesome, mischievous wretches that ever infested the habitations of man—a pure thief, stealing not merely articles of food, but substances which can be of no possible utility to him." Dr. G. however, does him the justice to say, that it is a misfortune in him rather than a fault, since he acts solely in obedience to the impulses of nature, and is, therefore, by no means as bad as the scoundrels of a higher order of beings, for whom a similar apology cannot be offered.

The rat is certainly one of the most formidable household annoyances the whole world over. Wherever man goes, rat goes ; and we are obliged to resort to ingenious expedients to circumvent him. Traps are frequently used—one of the best of which is an oblong box, one end and cover of which is in one piece, and when set rising above the trap as shown in fig. 112, and held up by a cord passing from the top through a smooth hole in the rear end to the inside, along the corner, around a smooth peg, to where it is attached to the bait and so fastened that it will drop at the first nibbling. A still better form is a trap with both ends thus raised, (fig. 113,) the cords passing through a cross piece in the middle, and arranged so that both ends shall drop at the same instant. These animals being cautious of entering holes or corners, are more easily drawn into a box open at both ends. Another mode of catching them is by means of steel traps, set with suitable baits. Some individuals among them, however, are too cunning to be caught in any trap, and sometimes evince a degree of inteillgence in this direction that seems almost incredible. The writer once made several fruitless efforts to catch an unusually cunning rat. A steel trap was placed in a large tin-pan, and covered with light bran so as to be entirely concealed ; and lest the rat should perceive the scent of the hands on the bran, a spoon was used for covering. Pieces of toasted cheese were then scattered over the surface. The next morning the cheese was taken, and little tracks were seen on all parts of the bran except immediately over the trap, which was untouched and unsprung. Trapping rats is a good amusement for ingenious boys ; but many would prefer a shorter and easier remedy. Poisoning with arsenic generally succeeds well, but requires great caution, and should never be adopted where there

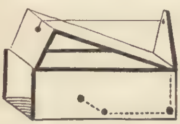


Fig. 112.—*Rat Trap.*

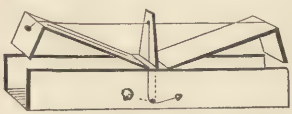


Fig. 113.—*Another Rat Trap.*

are small children, as fatal accidents have sometimes thus occurred. Different modes are adopted for using the arsenic; it may be rubbed with twice its bulk of lard or butter, or sprinkled on small fragments of chicken or turkey, and placed entirely out of the way where rats frequent. Another mode is to use fresh caustic potash, sprinkling it thinly around their holes and on their paths. It corrodes their feet which they then lick and their tongues are corroded. They dislike such treatment and disappear from the premises. The best remedies which we have found after long years of trial, are a few good cats. If not fed so high as to make them lazy nor so low as to dishearten them, they will be sure to clear every rat from the premises where they can have access.

MICE.—Nearly all the preceding remedies are sufficient when used for mice, especially the cats. The small traps sold in shops, answer a good purpose if owners are willing to take the trouble to set them.

SKUNKS.—These animals frequent the vicinity of houses for the purpose of stealing eggs, chickens, &c. On more than one occasion we have had them enter the house cellar through the windows. They are very easily caught in the box traps already described, with an egg or piece of meat for bait—when they may be carried out into the open fields and shot. They are also easily poisoned by breaking the end of an egg, dropping in a little arsenic, and placing it where it will be accessible to them, and beyond the reach of any domestic animals.

HOUSE FLIES.—Various traps have been employed for flies on the decoy principle, but these usually do more harm than good by constantly inviting new comers. We know of no remedy entirely satisfactory. A good deal may be accomplished by keeping rooms dark; or by driving them out and placing frames of mosquito netting in the windows. By not allowing dishes of food to stand long in dining room or kitchen, but placing them speedily in the cellar closets or safes, the tendency to draw flies will be lessened. We have known a dwelling to be kept nearly clear of them for an entire summer by a half grown cat that had a special fancy for catching them. We have also known the owner of a house to keep his rooms almost free from them, by spending a few minutes daily in catching them with his hand. He always struck towards their heads, sweeping his hand against the wall, and scarcely ever failing to make a capture. They were then thrown in a basin of soap suds held in his left hand. One of the best remedies is to poison with cobalt, which may be had at the shops. Make one or more small basins of sheet-iron or rusty tin, by bending up the sides of a piece a few inches square, as in fig. 114, mix the cobalt with water and place it in these basins. The flies eat, drop dead, and are swept up from the floor. The sole reason of using rusty iron for the basins is to render them forbidding in appearance and to prevent accidents. If placed in clean

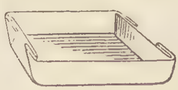


Fig. 114.—*Pan for Fly-Poison.*

porcelain basins, children may be in danger of becoming poisoned by idly partaking of the mixture.

ANTS.—Various modes have been adopted to kill them. Among these is to coat pieces of brown paper with molasses, sprinkle thinly with arsenic, and place them where they will be accessible to the ants, or the rough sheet-iron pans already described may be partly filled with sugar and water and a little arsenic. Such remedies should be carefully kept beyond the reach of children. Another mode of killing them is to wash a sponge freshly, to open its pores, and then sprinkle fine sugar into these pores. The ants will enter in large numbers and may be killed by plunging into scalding water. It may be questioned whether the employment of these remedies will not invite the ants in large numbers as well as kill them; and whether using them out of doors would not be better. It is said that red ants may be repelled from shelves by rubbing with fine salt. A skillful housewife informs us that she can exclude ants with certainty, from cake, sweetmeats and other articles specially attractive to them, only by placing them upon a table, each leg of which stands in a vessel of water. Doubtless the same result might be attained by placing the articles in a pan or other vessel resting on pebbles in another larger one containg water as shown in section in the annexed figure 115.

Fig. 115.—*Two Pans, with interposed water, to exclude ants.*

BED-BUG, (*Cimex lectularius.*)—This sometimes proves an excessive annoyance, and has been found by many difficult to extirpate. Travellers (the writer among the number) have sometimes preferred sitting up all night to attempting to sleep in certain badly kept hotels in remote countries. The Irishman consoled himself and his friends after a night of fruitless attempt at sleep—"Indade, I did quite as well as the bugs, for not one of them slept a wink all night." Among the many exterminators proposed for these insects, we have found two that have proved quite efficient. One of these is to dissolve a small quantity of corrosive sublimate in about twenty times its bulk of alcohol, and apply it with a brush to every part of the bedsteads and rooms likely to be infested. Two or three thorough applications usually accomplish the purpose. A more efficient and complete remedy is to beat up quicksilver with the white of an egg until a thorough intermixture is effected. A twentieth part in bulk of quicksilver is sufficient. Apply it throughly with a quill to every crack and crevice. We have never had a failure after the first application. Kerosene has been more recently tried, and we are assured on good authority is a perfect remedy.

MOTHS.—Keep the furs or woolens in trunks or drawers made of red cedar wood. Small pieces of gum camphor rolled in paper and placed among the furs, have proved a good remedy. Moths which have already entered garments or carpets, may be killed by exposure to bright sunshine;

or they may be steamed to death by placing a moistened coarse cloth, as crash towel, upon the substance and passing a hot iron over it.

COCKROACHES are killed or repelled by taking equal quantities of red lead and Indian meal, about the consistency of paste, with molasses, placing it upon iron plates where vermin are thickest. Borax scattered upon the shelves is said to be a good remedy.

EARTH-WORMS OR ANGLE-WORMS, may be prevented from entering wells by digging a trench three feet wide, close to the stone work and down well into the hard-pan, filling it with gravel, which they will not dig through. No top soil should be allowed.

REMEDY FOR MOLES.—Cut apples or potatoes in pieces about the size of a pea, and roll them in strychnine or arsenic. Then make several small holes where the moles run, and drop one or more of the pieces in each hole. In a short time the moles will disappear.

KEROSENE has been recently tried on a number of insects and has generally proved an efficient repellant, It is cheaper and of more ready access than some of the remedies given in this article, and is well worthy of trial in all cases where it can be conveniently applied.

AMOUNT OF BEEF OBTAINED FROM MEAL.

A CORRESPONDENT of the COUNTRY GENTLEMAN states that he purchases good, thrifty three and four years old steers and oxen that are well started, for winter feeding. He gives them the best of care, viz: Good hay fed at short intervals during the day, well carded once at least, and watered twice in the twenty-four hours; stables kept clean and warm, but well ventilated. His feed is usually corn, rye, (or barley) and oats—equal parts by measure, well mixed and ground fine. He feeds lightly at first, afterwards from rwo to eight quarts—feeding twice a day according to size of animal, four quarts each feed to a 1,500 steer or ox. He thinks he has never failed of one and a half pounds, live weight, equal to one pound dressed weight, per day. He adds, "you can make more beef at less expense by taking longer time—the undigested food is wasted." There is no doubt that with animals in poor condition and with neglected management, not one-half of this increase could be obtained. He adds that a little grain increases the appetite for hay, which must be of the best quality, while an excess lessens it and part of the grain passes off undigested.

STEAMED HAY.—E. W. Stewart writes to the American Farmer, that after an experience of more than ten years, he finds two bushels of steamed hay is worth three bushels of unsteamed, and that one quart of corn meal steamed with a bushel of straw. is equal to a bushel of hay.

GARDEN INSECTS.

By Asa Fitch, M. D., State Entomologist, Salem, N. Y.

IN LAST YEAR'S ILLUSTRATED REGISTER OF RURAL AFFAIRS, I commenced an account of our Garden Insects, treating of our most common and important species infesting the Onion, the Beet, Carrot, Parsnip, Radish and Cabbage. In continuing this subject, I have next to remark that the Turnip is so closely related to the cabbage, that most of the insects which depredate upon one of these vegetables attack the other also. Thus the leaves of the turnip and ruta baga are liable to have large irregular holes eaten in them by the same pale green worms, the larvæ of the White Butterfly, which we have already noticed as occurring upon the leaves of the cabbage. The Striped Flea beetle, an amended and more perfect representation of which we here present, (fig. 1,) frequently riddles the leaves of the turnip with small holes, and may always be met with upon these leaves in much the same numbers that occur upon the cabbage. It is of a sparkling black color with two broad wavy pale yellowish stripes, as shown in the accompanying cut, the short line on the right being its natural length. Upon cutting into the root of the turnip, its interior is frequently found to be traversed by one or more worm tracks of a dirty brown or yellowish brown color. These tracks are bored by a smooth cylindrical white maggot which appears to be identical in every particular with that of the Cabbage-fly, *Anthomyia Brassicæ*. If any bristly maggot, like that of the Turnip-fly, *Anthomyia canicularis*, also occurs in the worm-eaten turnip of this country, I have never been able to meet with it.

Fig. 1.—*Striped Flea-beetle.*

When the old roots of the turnip and ruta baga are set out for growing seed therefrom, we may frequently see some of their flower and fruit stalks covered over and crowded through their whole length with mealy plant-lice, which in some instances extend out upon the slender stems of the pods, and sometimes are so numerous as to cover the pods also—these insects thus, to the utmost of their power, exhausting the plant of those juices which should go to swell and perfect the seeds. Mr. Curtis supposed these lice, which thus throng the stalks and pods of the turnip, to be a distinct species which had escaped the notice of previous observers, and he therefore named them the Turnip-flower Aphis, *Aphis Floris Rapæ*. But Mr. Walker is certainly correct in regarding them as a mere variety of the cabbage aphis, which species is about as common upon the leaves of the ruta baga as upon those of the cabbage, and frequently locates itself upon the leaves of the turnip also. This insect we have now to notice.

The CABBAGE APHIS, *Aphis Brassicæ*, is an insect which is much more frequently to be met with than any other upon the cabbage and the ruta baga. Early in June, when the cabbage plants are but three or four inches high, these lice begin to make their appearance upon them. And ere long they become so numerous that they may usually be found upon some of the leaves of almost every plant, at all times from July until the close of the season—either wandering about, solitary or stationary, and crowded together in clusters, wholly covering portions of the surface of many of the leaves. And frequently a spot will be observed upon a leaf, where a mealy powder and numerous white cast-off skins, and often a few plump and swollen pale brown bodies of individuals, which have been killed by internal parasites, show that a flock of these plant-lice has recently been located there, which has been totally destroyed by the lady-bugs, and other enemies of these insects. It is upon the upper surface of the inner leaves, and upon the under surface of the outer leaves, that these stationary clusters of lice are located. Those which are in the former situation, are much the most pernicious, for by sucking the juices from and weakening this part, they cause the plant to head tardily and imperfectly, and if the lice continue numerous for some time upon these upper leaves, they become so exhausted that no head is formed by the plant. And in some instances the cabbage ground is invaded by such a host of these vermin, and they thrive so well and multiply so excessively, as to kill the plants outright. Thus, in the COUNTRY GENTLEMAN of July, 1857, p. 80, J. L. EDGERTON, reports that his patch of cabbages, of 350 fine thrifty plants, were attacked by this aphis just as they were beginning to head, and in three weeks every plant was covered by these vermin, and he lost the whole, neither ashes or salt having any effect upon the enemy. The clusters of these lice are almost wholly composed of wingless females and their young. One of these females is represented in the cut, (fig. 2,) greatly magnified. They are the largest individuals in the cluster and are of a pea-green color, smoothly coated over with a whitish mealy powder. The young or larvæ, are similar to the mature insects in every respect, except that they are smaller in size. The small newly-born larvæ, however, are destitute of the mealy coating, and are more narrow and cylindrical in their form than the larger ones. Standing here and there in the cluster may be seen an individual having wings. Mr. Curtis, in treating of this species, calls these winged lice the males. But this is an error. In every instance I find these winged lice to be pregnant females. I have never been able to discover a male of this species. In the annexed cut, (fig. 3,) is a greatly magnified view of one of these winged females, its natural size being shown in the small figure underneath. They are destitute of the mealy coating

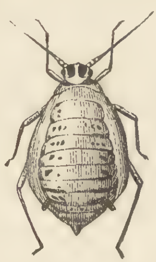


Fig. 2.—*Wingless Female of the Cabbage Aphis.*

of the wingless lice, and are black and shining, with the hind body pale-green, with dark-green or black bands, which are often narrowed or broken asunder in the middle. The natural enemies and destroyers of these insects—the lady-bugs, the larvæ of the Syrphus flies, little blind maggots of a bright yellow color, one or more of which will be seen in almost every group of plant-lice—are so numerous, and so alert and efficient in doing the work for which they were created, that we are usually safe in leaving the destruction of these vermin to them. But when clusters of these lice are discovered to be common upon the upper and inner leaves of the cabbages, I am confident it will be a great benefit to the plants to syringe these infested leaves with a strong solution of soap, as this will kill all the young and more tender lice, and will so invigorate the weakened leaves as to cause some of the plants to head, which will fail of doing so if left uncared for. If my cabbages should at any time become so thronged and overrun with these vermin, as in the case of Mr. Edgerton, rather than suffer them to be totally ruined, I would set short stakes among them, and spread a carpet or a large piece of canvas over as many of the plants as the size of the cloth would cover, and would burn tobacco here and there in cups underneath, till I was certain the smoke had filled the whole of the inclosed space. Hereby every aphis would instantly be smothered. I should then remove the cloth, and wash the plants thoroughly, by sprinkling them with clean water from a watering pot. I should then inclose and treat another portion of the plants in the same way, till I had gone over the whole. Tobacco smoke will cleanse any plant from lice, where it is so applied as to penetrate between the leaves sufficiently to reach every insect upon them. And this is the only certain remedy which is known. Strong soapsuds, so often recommended by writers, will kill all the young tender lice, but will leave most of the mature and old ones alive to found new colonies of these pests.

Fig. 3.—*Winged Female of the Cabbage Aphis.*

The CUCUMBER, the SQUASH and the MELON VINES, are so closely alike in their natural characters, that the same insects which depredate upon one of these plants, prey also upon the others, manifesting little if any preference for either one of them over the others. They are attacked by a number of different insects, from some of which they frequently receive great and sometimes fatal injuries. The worst enemy of these vines is the striped yellow CUCUMBER-BEETLE, or "Cucumber-bug," as it is commonly but less correctly termed—scientifically named the *Galleruca Americana* by Gmelin, and afterwards *G. vittata* by Fabricius. This beetle, in

its larva state is a worm living in the roots, and in its perfect state it gnaws the tender stalks of the young vines, frequently destroying the plants in one or the other of these ways. Early in the season, upon our first planting of cucumbers, melons and squashes, it frequently happens that the seeds do not sprout so to make their appearance above the ground, these cucumber-beetles lurking in cracks under the surface and nipping the young shoots as they protrude from the seeds, thus totally destroying them. And in other instances, when the seeds have sprouted nicely, we are sometimes surprised to find, a few days afterwards, that every plant in some, if not all, of the hills has disappeared—these beetles having discovered and destroyed them, secreting themselves in the crevices of the ground around them. Finally, when our vines have escaped these calamities to which they are liable in their infancy, and are growing thriftily and maturing their fruit, a particular plant is sometimes discovered to have its leaves drooping and wilted through the whole length of the vine and its branches, and, in a day or two after, it is found to be faded, dry and dead. Ere long, another vine in the same hill follows it, and then perhaps others, till in some instances all the cucumber and melon vines in the garden are perished. No wound or other injury is visible upon the stalks or leaves of the drooping plant, and we thus are led to suspect the malady is seated in the root; and, on coming to inspect this part, we immediately discover the cause of the disaster. The root is found to be irregularly eaten in spots and pierced with small holes, and its central pith more or less consumed and spongy, with one or more worms, the authors of the mischief, lurking within it. The accompanying fig. 4 represents a root of the cucumber or melon of the natural size and form, with its bark eroded in irregular spots by these worms, one of which is shown in the annexed cut, fig. 5, of the natural size, and on the right hand side greatly magnified. It is a soft, slender, cylindrical worm, of a dull white color, with the head and the last joint of its body black. It has three pairs of short, robust legs, placed anteriorly upon the breast, and a short, thick proleg at the tip of the body. When crawling it moves curiously, the fore part of its body advancing slowly but continuously, whilst the hind part alternately halts and hitches forward suddenly, step by step. In other words, the six legs upon the breast are constantly in motion, carrying the anterior end of the body along without any pause, whilst the hind end is held

Fig. 4.—*Cucumber root as bored by larvæ of the Cucumber-beetle.*

by the single proleg, and only advances when the body becomes stretched, when it makes a long stride forward and again halts. The worm, when it is done feeding, forsakes the root and forms a little cavity in the ground, by turning itself around and around in the same place, and crowding the dirt outward until it becomes compacted upon every side of it, forming a little lump of such firmness that it will not crumble or break asunder from any motion given to the earth around it by the hoe or the plow. Inside of the cell which it thus forms, the worm throws off the larva skin and becomes a pupa, appearing as represented in fig. 6, the small figure on the left showing its natural size. It remains in this form about two weeks, lying doubled together in its cell, without moving, and as though it were asleep. It then casts off its skin again, and thereupon acquires its perfect form, but is at first very soft and flaccid, and of a white color. To enable the superabundant fluids of its body to evaporate, and its several parts to acquire suitable solidity and strength, it remains in its cell without any motion or symptom of life for some days, when suddenly, as if touched with a shock of electricity, it awakes into full life and vigor, and with its feet and jaws briskly attacks the walls of its prison, breaking an opening through them, and scrambles upward out of the earth and runs fleetly away, joyously exulting in its newly acquired life and liberty. It now has the form and parts shown in the accompanying fig. 7. It is glossy and shining, of a bright pale lemon-yellow color, with the head and three stripes on the wing-covers black. These beetles come forth from their winter retreats and begin to appear abroad as early as the commencement of May. They continue through the whole season, and are among the last insects which withdraw in the autumn, some of them remaining into the month of October. They manifestly prefer those plants which are most young, tender and succulent. After the stalks are so grown that they begin to shoot out into running vines, they are so robust and vigorous that they withstand the wounds which they continue to receive from these insects. Hence it is only when the plants are young and small that they require to be protected. The beetles are so shy and timorous that any new and unusual appearances about the cucumber hills may cause them to forsake them in some instances, when at other times they will have no effect. Hence, many of the remedies which have been proposed are of but slight efficacy and quite unreliable.

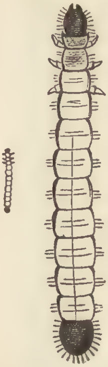


Fig. 5.—*Larva of the Cucumber-beetle.*

Fig. 6.—*Pupa of the Cucumber-beetle.*

Fig. 7.—*Cucumber-beetle.*

Inclosing the hills in boxes, open at the bottom and top, ample experience has shown to be one of the securest protections of the many which have been proposed.

Next to the Cucumber-beetle, our worst enemy, particularly to the squash and pumpkin vines, is the SQUASH-BUG, *Gonocerus tristis*, which is represented in the annexed cut, fig. 8. This is a true "bug"—it being of a soft, leathery texture, dull in its colors, slow in its motions, fetid in its smell, flattened in its form, and it is greatly to be regretted that in this country we are so much accustomed to give this same name to insects so very different from this as are the hard shelled, shining and brisk-motioned "beetles." This Squash-bug is of an obscure, dark brown or blackish color, and on its under side dull yellowish, varied with black points and freckles. It begins to find and attack the plants when they are first sprouting from the ground, puncturing them with its sharp, needle-like beak, and sucking their juices, thus causing them to wilt down and die—hiding itself under the loose surface-dirt or in the cracks of the surface immediately around the plants. About the middle of June it commences depositing its eggs, gluing them to the under side of the leaves in clusters of ten, twenty or more. They are white, changing to yellowish brown, and hatch in about a fortnight, producing small wingless bugs of an ash gray color, which remain together in a flock upon the under surface of the leaf, casting their skins as they increase in size. This is the larva state of these insects; and when they are grown to half an inch in length they acquire two small oval scales, which are placed one upon each side of the fore part of the back, the bug being then in its pupa stage, and with the next change of its skin it obtains its perfect form and its full size. So common are these Squash-bugs in every garden in our country that they are well known to every reader of these pages, and he is sufficiently aware of their pernicious character, and that if they are not combatted and checked in their career some of the vines will frequently be destroyed by them. From the time the seeds begin to sprout until midsummer the plants should be examined and freed from this enemy, more or less frequently as it is found to be more or less common in particular years. The bugs are so large and so dark colored that the eye readily perceives them, and they are so stolid and sluggish in their motions that they are easily picked from the leaves, dropped to the ground and crushed beneath the sole of the boot. And during the latter half of June the eggs should also be repeatedly searched for upon the under side of the leaves. They may be destroyed by pressing and cracking them between the thumb nails, or those clusters which are near the margin of the leaf may be torn out and effectually trampled upon or taken to the house and thrown into the fire.

Fig. 8.—*Squash-bug.*

The SQUASH COCCINELLA, or Spotted Squash-bug as it has been called, (*Coccinella borealis*,) feeds upon the leaves of the squash, eating in them

large circular holes. We are so accustomed to regard the Coccinellas, or Lady-bugs, as insects of the highest utility, feeding as they do upon the plant-lice and everywhere freeing our vegetation from these vermin, that we view it as a singular anomaly that a member of this group should sustain itself upon vegetation. The remarkable habits of this Squash Coccinella were communicated to me several years since by Mr. A. O. Moore of New-York, who gives a valuable account of it, with illustrations, in the COUNTRY GENTLEMAN of April 1, 1858, p. 210. I have no knowledge of this insect as occurring anywhere north of the Highlands upon the Hudson River, but have met with it as a common species in Southern New-York and Connecticut, from whence its geographical range extends south, over the continent and into Brazil. We learn from Mr. Moore that the beetles begin to appear around New-York early in June, feeding upon the squash leaves and depositing their eggs in irregular groups on the under side of these leaves. The larva is armed with branching thorn-like spines, symmetrically placed in rows. A side view of this larvæ, its natural size, is given in fig. 9, and a magnified representation of its appearance when seen in front, and showing the formidable spines with which it is protected, is presented in fig. 10.

Fig. 9.—*Larva of Squash Coccinella.*

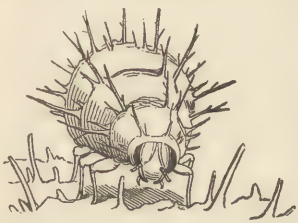


Fig. 10.—*Front view of the larva, magnified.*

Fig. 11.—*a. a. Circular marks cut on leaves by the Squash Coccinella and its larva.*

It eats voraciously and grows rapidly. Both the larva and the perfect insect have the curious habit of first nibbling a curved line upon the surface of the leaf, marking out a circle or semi-circle, sometimes of great regularity, inclosing the portion of the leaf on which it is about to feed, as represented in the preceding cut, fig. 11. The larva, after attaining its growth, crawls to some sheltered place upon the under side of the leaf or upon the stem, where it securely fastens itself, and changes to a pupa inclosed in the dried and thorny skin of the larva. It remains dormant in its pupa state somewhat over a week, when the beetle in its perfect form crawls out from the thorny case. It is now of a hemispherical form, as shown in the cut, fig. 12, and of a dull yellow color, with five black spots in a transverse row on the fore part of its closed wing-covers, five more spots in another row across the middle, and two larger spots back of these, near the tip. The only efficacious remedy yet found for these insects, is hand-picking, or brushing them from the leaves into a cup partly filled with strong brine, which should be done when they first appear in June, before they have commenced laying their eggs.


Fig. 12—*Squash Coccinella.*

The little black Flea-beetles which infest the cucumber and melon leaves, perforating them with numerous small holes, are mostly the PUNCTULATED FLEA-BEETLE, *Psylliodes punctulata.* They are closely like the kind which occurs upon potato leaves, hereafter to be noticed, but when carefully examined with a magnifying glass their differences are sufficiently evident. Those which occur upon the cucumber leaves are brassy-black, with the surface of their bodies finely punctured, and their shanks, feet, and the first joints of their antennæ pale obscure yellowish. The remedies already mentioned for the Striped Flea-beetle are equally efficacious for this and the several other species of flea-beetles.

The ASPARAGUS in this country has been remarkably exempt from injury by insects, until some eight or nine years ago, when the ASPARAGUS-BEETLE, *Crioceris Asparagi,* long noted in Europe as being most pernicious to this plant, began to be met with by insect collectors in the vicinity of New-York, it having then in some manner found its way across the ocean; and in 1862 it had become so excessively multiplied and was overrunning the asparagus in such countless millions as to threaten to kill the plants and put an end to their cultivation in the market gardens in the neighborhood of that city, where this was a crop of such very great value. These beetles and their larvæ feed upon the asparagus through the whole summer season. The following cut, fig. 13, gives a view of this insect in its different stages. The beetle is seen its in natural size and shape at *a.* It is of a deep green-blue color, very bright and shining, and prettily ornamented with yellow spots. It places its eggs on the leaves of the plant as seen represented at *b*, the magnified eggs being seen at *c*. From these hatch a larva of a dull olive or ash gray color, which is represented young at *d*, full grown at *e*, and magnified at *f*. Its pupa state is passed under

the ground. In a visit made to Long-Island in the autumn of 1862, to examine this insect, in company with D. K. Young, Esq., of Matinnecock, who had furhished information for an interesting notice of it in the Country Gentleman, vol. XX, p. 81, we discovered these beetles in their winter retreats, every crevice under the loose scales of bark upon the trees, in the cracks in fence rails and under the clapboards of buildings, being crowded with them; and we found that fowls ate these insects with such avidity that we could confidently recommend the keeping of them upon the asparagus grounds as the best mode of subduing this enemy. The beetles came out from their winter quarters in full force, towards the middle of May the following year; but some atmospheric or other change unfavorable to them, arrested their career, and they became greatly diminished in numbers before the close of that season, and have so continued since, whereby they have ceased to be objects of such deep anxiety as they temporarily were at that time.

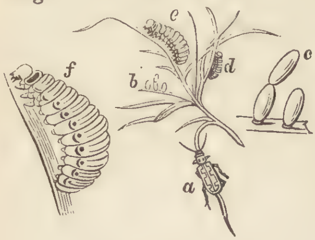


Fig. 13.—*Asparagus-beetle, its eggs and larva.*

The Tomato in all our gardens is infested with a very large thick bodied green worm, with oblique white streaks along its sides, and a curved thorn-like horn at the end of its back, as represented in the accompanying cut, fig. 14, which shows the appearance of this worm when it is grown to about half its full size. Between thirty and forty years ago, when the tomato was first beginning to be extensively cultivated in our country, this worm appearing upon it was an object of much terror, it being currently regarded as poisonous and imparting a poisonous quality to the fruit if it should chance to crawl upon it. Now that we have become familiarized with it these fears have all vanished, and we have become quite indifferent towards this creature, knowing it to be merely an ugly-looking worm which eats some of the leaves of the tomato, and which is chiefly interesting to us in consequence of its being about the only insect enemy belonging to this plant. As the worm, however, is so common and well known, every one feels curious to know also its history and the insect which produces it. We therefore here present a short account of it, with figures illustrating its appearance in the different stages of its growth.


Fig. 14.—*Tomato-worm.*

It is currently supposed that these worms belong exclusively to the tomato. They, however, occur upon the vines of the potato also. And in those neighborhoods where the tobacco is cultivated, they invade that plant likewise, causing much injury by the holes they eat in the leaves,

whence they are the worst enemy with which the tobacco grower has to contend. Thus it is one and the same insect which is popularly named the Tomato-worm, the Potato-worm and the Tobacco-worm, as it occurs upon one or the other of these plants. The annexed cut, fig. 15, represents the moth or miller which is the parent of these worms, diminished to half its natural size. It is of a gray color, with numerous irregular and obscure black marks upon its wings, and a row of five round ochre-yellow spots along each side of its hind body, from which it has received its scientific name, *Sphinx quinque-maculata*, or the FIVE-SPOTTED HAWK-MOTH as it is termed in books. These moths come abroad one after another through the whole summer and autumn, but are most numerous in July. During the day time they remain at rest, hid from view, and come out in the evening to feed and lay their eggs. Their sole food is the honey of flowers, for obtaining which they are furnished with a remarkably long slender tongue, which, when not in use, is coiled up like a watch-spring and concealed between the palpi or feelers at its base. When hovering around flowers and extracting the honey from them the moth resembles a humming-bird in its motions and also in the sound made by its wings. The tongue is fully extended at such times, and being five or six inches in length, the moth is poised on its wings at a distance of some inches from the flower from which it is sucking the honey. The eggs are probably placed on the under side of the leaves of the plants on which the worms occur. The worms are voracious feeders, consuming a large quantity of foliage and growing rapidly. When they have attained their full size they leave the plants on which they have fed and root downwards into the ground to the depth of some inches, and there become quiescent, and casting off the larva skin, they appear in their pupa form, represented in fig. 16, diminished one-half in size. The pupa is covered with a hard crustaceous shell of a glossy bright chestnut color, and is particularly curious from having its forward end prolonged on one side into a long slender limb, which is bent backwards, reaching to the middle of the body, where its end touches, and is firmly soldered to the surface, thus forming a kind of loop, resembling the handle of a pitcher—this being the sheath in which the tongue is enclosed, which becomes developed to such

Fig. 15.—*Tomato-worm Moth.*

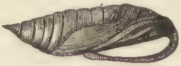


Fig. 16.—*Tomato-worm Pupa.*

a remarkable length in the perfect insect, as we have above observed. The insect remaining in this pupa form through the winter and spring, its internal parts growing and becoming developed, until the shell at length cracks open and the moth withdraws itself from it, crowds upwards through the ground, and comes forth in its perfect form.

To the south of us a worm occurs which is almost identical with this in every respect, and feeding upon the same plants. This SOUTHERN TOBACCO-WORM, or, as it is termed in its perfect state, the CAROLINA HAWK-MOTH, *Sphinx Carolina*, may be distinguished by the markings of its hind wings. In the moth of our Northern worm will be seen four black bands crossing the hind wings, whereof the two middle ones are very angular and zig-zag, often much more so than is indicated in the cut, fig. 15. But in the moth of the Southern worm, instead of these two angular bands we see a single broad band, which is smooth along its edges. And the same measure is resorted to for subduing both these worms. The leaves of the tomato and potato being of no economical value, we disregard the small injury they do those plants. But the whole value of the tobacco rests in its leaves; hence every meal which one of these worms makes upon that plant is an important injury. Consequently "worming" of the tobacco fields, as it is termed, is an indispensable measure, forming a regular part of the tobacco culture. Notwithstanding the closest scrutiny some of the worms will elude notice at each search which is made; and new moths are coming out and depositing their eggs, night after night, whereby a succession of these enemies are appearing. Thus it becomes necessary to repeat the search daily, in order to secure the destruction of every worm while it is yet young and small.

The POTATO usually is the least molested by insects of any important vegetable we cultivate. Recently, however, an enemy to it has appeared which threatens to annihilate our growing of this esculent. This is the TEN-LINED POTATO-BEETLE, *Doryphora* 10-*lineata*, a figure of which is presented in the accompanying cut. This beetle is of a regular oval form, very convex above and flat beneath, of a hard crustaceous texture, smooth and shining, of a bright straw yellow color, with ten black stripes upon the back of its closed wing covers. It is upwards of 40 years ago that this insect was first noticed, upon the upper Missouri and Arkansas Rivers, some hundreds of miles west of the Mississippi. It has no doubt always existed in that region, living upon some wild plant growing there, very probably the stramonium, and it was never known to attack the potato until the year 1861, when, in different places in Kansas and Western Iowa, it suddenly fell upon this crop, in such immense numbers as to literally cover the vines, eating from them every vestige of their leaves, and leaving the stalks perfectly bare. It also consumed the leaves of the tomato with equal avidity. The next year it re-appeared early in the season, soon after the potatoes

Fig. 17.—*Ten-lined Potato-beetle.*

were sprouted from the ground, and in a short time commenced scattering its eggs everywhere upon the leaves and stalks, the young filthy worms from which also fed upon the leaves in company with the parent beetles, keeping them so eaten down that no tubers, or at least none of sufficient size to be of any value, were formed upon the roots. And it has since continued to appear, multiplying and extending itself each year, advancing eastward at the rate of seventy or eighty miles annually. It has already crossed the States of Iowa and Illinois, and has probably penetrated a considerable distance into Indiana. It has thus traveled some five hundred miles from its original haunts, and has traversed nearly half the distance from thence to us. Should it continue to progress at the same rate it has hitherto done, six or seven years will bring it to us here in Eastern New-York. We cannot but hope that before that time elapses some atmospheric change or other influence will occur to arrest its advance, like that which we have noticed in the case of the Asparagus-beetle, or that some easy mode for effectually destroying it will be discovered. In reply to the numerous letters of inquiry for a remedy for this beetle which have been sent me, I have only been able to say that hand-picking or brushing and shaking the insects into a pan or basin of water held under the vines, was the only measure I could confidently recommend, and this "bugging the potatoes," as it has come to be termed, is much resorted to upon a small scale in the gardens, with a fair degree of success, it being only by perseveringly gathering these beetles from the vines and destroying them that any potatoes are grown in those places where this insect is present in full force.

The THREE-LINED POTATO-BEETLE, *Crioceris trilineata*, is an insect related to the preceding, which has always been common upon the potato vines, feeding on the leaves both in its larva and its perfect state. The accompanying cut will give the reader a correct idea of its form and general appearance. It has a considerable resemblance to the yellow striped cucumber-beetle which we have already noticed, being of a bright lemon-yellow color with three black stripes upon its closed wing-covers, but it is larger than the cucumber-beetle, and easily distinguished from that insect by having a yellow instead of a black head. Probably not a year occurs that this Three-lined Potato-beetle is not to be found on the potato vines in every neighborhood throughout our country; but it is much more abundant some years, and when unusually numerous, fears are frequently excited by it. It is also common upon the stramonium, which is probably the plant upon which this insect chiefly sustained itself before the potato began to be cultivated here. This latter now furnishes it such extensive feeding grounds that its numbers are no doubt much greater now than they could have been originally; and in the course of time it may become so increased as to be a serious evil.

Fig. 18.—*Three-lined Potato-beetle.*

These beetles pass the winter in any dry and sheltered situation which they find, under boards, masses of fallen leaves, &c. They begin to be seen abroad the latter part of May. They are shy and timorous, taking wing as you come near them, and flying a few yards away. When annoyed or in distress they make a creaking cry by rubbing the tip of the body up and down against the hind end of the wing-covers. When the potatoes are well up they gather upon them, eating large irregular holes in the leaves, and ere long commence depositing their bright yellow eggs, gluing them to the leaves in clusters of from six to ten in number. They hatch in a fortnight, and the larvæ from them continue together in a flock upon the undersides of the leaves. They are wet, slimy, slug-like worms of a most filthy and disgusting appearance, coating themselves over with their excrements, probably to protect them from being devoured by birds. When they have attained their growth they descend into the ground to pass their pupa state. Should these insects anywhere become so multiplied as to do any severe injury to the potato crop, the readiest mode to diminish their numbers I think will be to search out the little flocks of the larvæ by passing along the rows of the potato vines, and break off the leaves on which they occur, dropping them upon the ground and trampling upon them.

The STRIPED BLISTERING-FLY, already noticed as feeding on the leaves of the beet, at times appears in immense multitudes in one district of the country and another, eating the potato vines bare of their leaves. Other kinds of these blistering-flies also feed upon the potato leaves, and are liable to be quite numerous at times. They are similar in size and form to the striped species, being cylindrical and about half an inch in length, but are readily distinguished by their colors. Much the most common kind here at the north is the BLACK BLISTERING-FLY, *Cantharis Pennsylvanica*, which is of a deep black color throughout, and without spots. We occasionally meet with the ASH-EDGED BLISTERING-FLY, *Cantharis cinerea*, also, this being black like the preceding, but having its wing-covers edged with ash-gray from fine short hairs of this color. Another species is the ASH BLISTERING-FLY, *Cantharis Fabricii*, which is wholly coated over with short, ash-gray hairs. Each of these insects becomes more common to the south of us, where still other kinds of these flies are associated with them, whereby the potato crop there suffers more frequently from them than it ever does with us. The large green TOMATO-WORM, *Sphinx quinquemaculata*, as already stated, is somewhat common upon the potato also, eating its leaves. The potato leaves are also much infested with little black flea-beetles, perforating them with small holes, frequently in such immense numbers that they cannot but be a detriment to the crop. The species which is most common upon this plant is the HAIRY FLEA-BEETLE, *Haltica pubescens*. This is slightly inferior in size to the Striped Flea-beetle already spoken of, and is not at all glossy. It is black and thinly coated with short whitish hairs, its antennæ and legs being dull yellow. It is abundant in the garden from early in May till the frosts of autumn drive it into its winter retreats. It attacks several plants in addition to the

potato. To the petunia it is the most injurious of any insect in my experience, the young seedling plants becoming thronged and ruined by it unless they are closely watched. It is also apt to be a serious evil to the young tomato plants, which are weakened and retarded in their growth from the numerous wounds they sometimes receive from these insects before their presence is observed. The remedies for this are the same as already mentioned for the Striped Flea-beetle.

Among the worst pests to our garden crops and to our field crops also, are the WIREWORMS, so-called from their having some similarity in their form, their smoothness and hardness, to a piece of wire. They are remarkably long, slender, cylindrical worms, of a whitish or tawny yellow color, with a very tough, smooth and glossy skin. They are the larvæ of the Elater group of beetles, which are known to every one from their curious manner of recovering their upright posture when they chance to fall upon their backs. Their legs being too short to enable them to turn over, they have the faculty of giving a sudden snap or spring, whereby they bound upward several inches, and in falling usually alight right side up, or if they fail of doing so, they repeat this spring again and again, until they succeed, with each spring making a loud click, similar in sound to the ticking of a clock. They have hence come to be designated in this country by the name of "Snapping-bugs," although they are beetles and not bugs in the correct sense of those terms. These Elaters or Snapping-beetles are an extensive group of insects and there are consequently numerous kinds of wireworms. They live underground and feed on the roots of grass and other vegetation, and on planted seeds which are beginning to germinate. They are known to attack potatoes, turnips, cabbages, beets, carrots, onions and lettuces in our gardens, and also strawberries, pinks, carnations, dahlias, lobelias and numerous other flowers, but the greatest losses are from their destruction of the field crops, Indian corn, wheat, rye, barley and oats. They bore everywhere around through the bulbous and other thick roots of some plants, and cut off the slender thread-like roots of others. And it is not till the plants begin to wither and turn yellow that their presence is suspected, when the plants are usually so badly injured as to be beyond recovery. It has not been known hitherto which were the particular species of Snapping-beetles which produced the wireworms which in this country injure our crops. As one of our species bears a very close resemblance to the European beetle which has been most noted for the destructiveness of its larva, it has been conjectured that the wireworm which this species produced would be one of our most injurious kinds. This is the TRUNCATED SNAPPING-BEETLE, *Agrates truncatus*, erroneously named *obesus* in Dr. Harris' Treatise. Among the insects of

Fig. 19.—*Truncated Snapping-beetle.*

this group this is a species which is remarkably short and thick, as represented in the preceding cut, fig. 19, the smaller one on the right hand side showing its natural dimensions. It is of a dark brown color, with the wing covers a shade paler than the fore part of the body. And a side view of the wireworm which my observations indicate to be the larva of this beetle, is given in the accompanying cut, fig. 20, the line underneath showing the full length to which it grows. This worm has no impressed line along the middle of its back, and the last joint of its body is nearly twice as long as broad, ending in a somewhat acute angular point, and having on its upper side towards the base two conspicuous dots, resembling breathing pores. As this beetle and worm have occurred to me only in situations where the land is never plowed, but remains permanently in grass, it is not probable that this is a species which attacks our cultivated crops. The Elater, which is most frequently found in our gardens is the *Cratonychus communis*, or the COMMON SNAPPING-BEETLE, which is represented in the annexed cut, fig. 21, the outline figure on the right being its natural size. It is of a dark chestnut color, covered over with short, fine, prostrate ash-gray hairs, its wing-covers having rows of punctures resembling the stitches in a garment, and its forebody showing an impressed line in the middle. This species is well entitled to the name it has received, it occurs so plentifully in such a variety of situations in all parts of the United States. During the months of April, May and June it is most abundant. Its numbers then diminish, and it nearly or quite disappears in August, but is again met with in September and till the close of the season. A corner of my garden having been unoccupied a few years, became overgrown with quack grass, and in April a perfect swarm of these beetles were there gathered, basking in the warm sunshine, having hatched from wireworms, I suppose, which had fed upon the roots of this grass. They occur quite frequently also in strawberry beds, and similar places where the dense foliage furnishes a hiding place for them. The wireworms which I meet with in the garden are nearly all of one particular kind, and I hence have little doubt they are the progeny of these beetles. A magnified view of the back of these wire worms is given in the cut, fig. 22, the straight line

Fig. 20.—*Wireworm of the Truncated Snapping-beetle.*

Fig. 21.—*Common Snapping-beetle.*

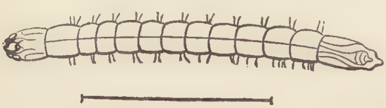


Fig. 22.—*Common Wireworm.*

below showing the length to which they grow. This garden wireworm has a strongly impressed line along the middle of its back, and is particularly distinguished from other wireworms by having three obtuse teeth-like projections at the end of its body, the middle one being much larger and more conspicuous than the lateral ones. It is to be regretted that no certain and efficacious remedy for the wireworm has yet been discovered. Every worm of this kind which is turned up to view in cultivating the garden should be destroyed. The small young worms, less than a fourth of an inch in length, which occur the most common in autumn, it is especially important to kill. As the wireworms are particularly fond of the potato, it was long ago recommended to employ slices of this tuber as a trap with which to capture them. Several of the contributors to the London Gardener's Chronicle concur in this as being the best mode of freeing the garden, at least, from these troublesome visitors. Mr. Adan says it is his practice to place near any infested plants, half a potato, with the eyes cut out to prevent its growing, running a pointed stick through it and pegging it into the ground, covering it over with about an inch of loam, and in a day or two, he states, he has pulled out from fifteen to twenty wireworms, bored into one of these slices of potato. Turnip, carrot, beet, apple, &c., are reported to answer the purpose equally well as the potato. This remedy was proposed so long ago that I am surprised it has not come into more general use, if it is as successful as the accounts of it represent it to be. These worms are also reported to be so fond of rape-cake that if this be applied to the ground as a manure, they will forsake everything else to feed upon it. If this be the fact, this substance is worthy of more attention than it is receiving.

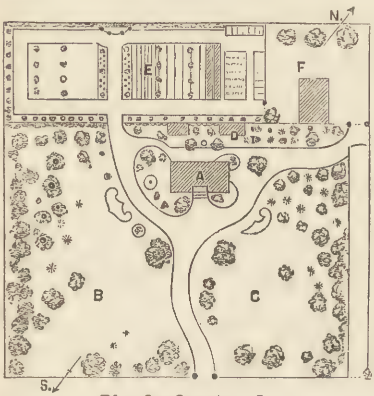
Having now completed a review of our most common and important insects which infest garden vegetables, I propose, in a future number of the REGISTER, to present an account of those which injure the small fruits which are cultivated in our gardens—the strawberry, raspberry, blackberry, currant and gooseberry. Those who wish for more full information upon any of these insects than is here given, will find most of them treated of at length in my latest Reports on Noxious Insects, published in the recent volumes of Transactions of the N. Y. State Agricultural Society.

VALUABLE CEMENT.—Professor Edmund Davy lately read a paper to the Royal Dublin Society on a cement which he obtains by melting together, in an iron vessel, two parts by weight of common pitch with one part of gutta percha. It forms a homogeneous fluid, which is much more manageable for many useful purposes than gutta percha alone, and which, after being poured into cold water, may be easily wiped dry and kept for use. The cement adheres with the greatest tenacity to wood, stone, porcelain, ivory, leather, parchment, paper, hair, feathers, silk, woolen, cotton, linen fabrics, &c. It is well adapted for aquariums.

PLANS OF GROUNDS.

AS I HAVE spent a large part of my life in the improvement of country and suburban homes, I flatter myself that these plans will be found practical, as I have always not only designed, but also executed, my plans in facto. According to my experience, it is of no great benefit to give very special instruction as to the kind of ornamental trees and shrubs to be planted, as the selection has generally to be made from what may be found in local nurseries, or the local forest growth. The latter has always been my main source of supply. The same difficulty I found in naming any special kind of Apples, Pears, etc., to be planted; each section of country has its favorites. In the planning of garden and cultivated lots, I mostly kept home-consumption in view, with a few hints where it should be desirable to raise fruits, etc., for marketing.

PLAN I.—A Square Acre Lot.—A, the dwelling-house, with surrounding plots of ground; a good shade tree in front, (Sugar or Norway Maple,) one ditto to the west, (Maple or Sweet Gum Liquidambar,) farther on in the centre of the walk an Oak, with rustic seat. To the east and north plant small clumps of Magnolia glauca; an Oak to the north in the centre of the roads. At the southeast there is a circular flower bed, with an evergreen shrub or a Magnolia purpurea for centre, as also a few choice shrubs, as Weigela, Philadelphus, Pyrus japonica, &c., as single specimens.



Plan I.—One Acre Lot.

B. Along the southwest boundary there is an irregular belt of forest trees and shrubs, as Euonymus, Fringe, Sourwood, Andromeda, Black Hawthorn, Viburnum, Wild Plum, Sassafras, Spice Bush, Cratægus, etc. The space at the west corner of the lawn may be occupied by a dozen standard Pear and Cherry trees of handsome growth. To the front of these a few evergreen and large growing flower shrubs towards the garden walk; there is also a larger bed for smaller flower shrubs and roses, and a small circle for Petunias, etc., with a Magnolia or other choice tree as centre. The shade tree to the front of the house, a fine Sugar Maple; for

planting along the public road, European Larch, Winged Elm, Scotch Elm, Hornbeam, Purple Fringe, Red-bud, &c.

C. There is a stable road along the northeast boundary, screened by an irregular plantation of forest trees with shrubs as undergrowth ; at the angle of the stable roads plant a sturdy Oak, an Ash-tree and evergreens, to break the north winds. East of the house there is another bed for choice shrubs and larger flowering perennials ; and east of that a choice Weeping tree ; to the front of the house a fine Sugar Maple ; in the bend of the road a Tulip tree and two deciduous Magnolias.

D. A space occupied by out-houses, gardener's cottage and cistern, with shade trees, evergreens, &c., as shelter against the northwest winds. Back of the cistern, between the out-houses, plant two Lombardy Poplars, with two Elms or Maples in front, which will make a spirited background for the residence.

E. The garden, with currants and gooseberries in the southeast and southwest borders ; grapevines along the northwest border, with a neat, cosy grape arbor at the terminus of the middle garden walk ; hot-beds in north corner. There are twenty-two dwarf Pears planted at considerable distances through the garden, so as to interfere but little with the raising of vegetables. The northeast square is mostly occupied by strawberries, raspberries, blackberries, and two asparagus beds ; in front of hot-beds, two large borders for salading, seed beds, sweet herbs, &c.

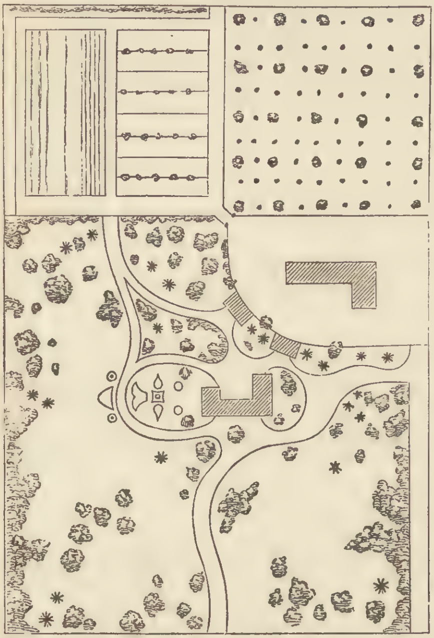
F. Stable yard with cistern near garden gate, and a few Elms and Oaks for shelter ; well protected against the stock while young.

PLAN II.—A Three Acre Lot.—This is designed for a place whose owner is a lover of flowers and shrubbery, as well as of choice forest and shade trees. The flower garden south of the house is stocked with choice, low-growing roses, bedding plants and annuals, with a vase or statue in the centre ; two neat-growing specimen shrubs, (Tree-box, Weigelas, Spireas ;) the adjoining shrubbery bed to be filled with evergreen shrubs, (Mahonia or Pyracantha.) The bed in the angle of the walks to the garden, plant with Spireas ; the one to the south of the garden walk with Roses, Calycanthus and purple Magnolia, with a few Snowballs, Lilacs and Philadelphus scattered on the lawn as single specimens.

The large irregular half circular bed in the rear of the house plant closely with a variety of low flowering trees, such as double-flowering Cherries, Peaches, Thorns, Viburnums, Laburnums, Euonymus, Dogwood, Redbud, with Spireas, Privet, Lonicera, Cornus sanguinea.

The bed on the northwest of the house plant with roses and larger perennial flowers, with a few purple Magnolias or Calycanthus in the centre to produce a heavier foliage, with Pyrus japonica, Barberry, Lonicera, double flowering Altheas, ete., as specimens scattered along the roads in front, and among the forest trees. One or two Copper Beeches, or the Purple Filbert, or Purple Barberry often produce a fine effect. The larger bed in front might be planted with Magnolia glauca, and a few Sassafras. The

boundaries of the lawn south and north are concealed by irregular plantations of forest trees, with a heavy undergrowth. For this purpose I would particularly recommend the Dogwood, Redbud and Blackhaw, which is always beautiful in flower and leaf, particularly so in its splendid autumn coloring; then also the Hazel, the Service, (June-berry,) Mountain Ash, Wild Plum, Euonymus, Hornbeam, Winterberry, etc. These will, with now and then a few evergreens and the sheltering, larger shade trees, form a fine scene of landscape in spring, summer and autumn. Protect the house to the northwest by a plantation of Pines and Firs, with Oaks and Elms. The space on either side of the walk to the garden might be planted with twelve to fourteen standard Pear and Cherry trees of good growth. Along the garden fence there might be trained flowering vines, or, if preferred, grapes.



Plan II.—Three Acre Lot.

At the west end of the garden there is a small tool-room, with vine covered seat in front. The west border is planted with choice grapes, as Delaware, Concord, Hartford Prolific, etc.

One half of the vegetable garden is devoted to the cultivation of small fruits, and one or two Asparagus beds. On the other half are planted two dozen dwarf Pear trees; the ample space between them is devoted to vegetables.

The orchard is to the west of the stable-yard, and planted mainly with Apple trees, the row next the garden to be standard Pear or Cherry trees. Between the Apple trees might be planted Peach trees, or, if preferred, dwarf Pears; or the space between the Apple trees might for a number of years be cultivated to raise root crops.—[S. SCHULER, *Louisville, Ky.*

RAIN GAUGE.

THE SIMPLEST RAIN GAUGE is a square or cylindrical vessel, open at top, with a scale marked inside to show the depth of the water as the rain falls. The depth of rains may be nearly measured by simply placing out, on an open piece of ground, a tin pail with parallel sides, and then measuring the depth with a small, thin rule. It is more common, as well as convenient and accurate, however, to make the top of the gauge somewhat in the form of a hopper, throwing the rain together down a graduated tube. The depth being thus multiplied, the amount fallen can be more perfectly measured. If, for example, the tube is one-tenth the area of the hopper, a fall of one inch will show ten inches in depth; or if the tube is a hundred times smaller than the hopper, a tenth of an inch of rain will give a ten inch column. In all gauges of this kind, which multiply the depth, it is safest to have a small cylindrical vessel attached to the side of the instrument to show the fall in case of a great storm, which might more than fill the narrow tube. There are various modifications of rain gauges—one is made by using a funnel placed in the mouth of a jug or bottle, into which all the water immediately runs. It is then poured into a graduated tube and accurately measured. If the quantity will more than fill the tube, it may be measured by successive portions. The most convenient way of placing this gauge, is first to sink a small barrel into the ground, cover it with a wooden board so made as to throw the rain from the centre, where a hole is made just large enough to receive the funnel. The bottle or jug for holding the water is placed in the barrel below the funnel. In the accompanying figure, *a* represents the barrel, *b* the board cover, *c* the funnel, *d* the bottle, and *e* the graduated glass tube, which may be kept when not in use within the barrel.

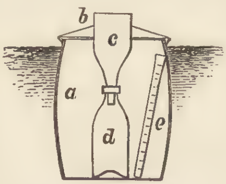


Fig. 1.

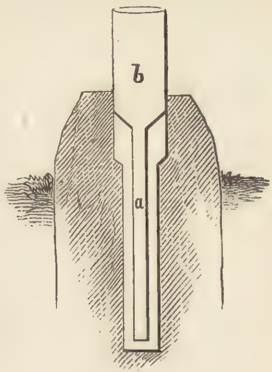


Fig. 2.

Fig. 2 represents a *modification* of the gauge already spoken of, having the tube, *a*, attached to the funnel, *b*, both of which may be made of brass or tin plate. A convenient mode for setting this guage is to set a short wooden post into the ground, projecting a few inches above it, and then

bore a hole in the top of the post the size of the funnel, an inch or two downward to receive it, and then another hole, a little smaller, deep enough to receive the tube. The depth of the water in the tube is accurately measured with a thin whalebone scale. This should be divided by experiment, by placing equal and successive quantities of water in the tube, which will correct any inequalities in the bore. If a heavy rain should more than fill the tube, the excess should be poured off and afterwards measured.

In placing the rain gauge, an open piece of ground should be selected, where buildings or trees will not affect the quantity when blown by side winds, and it should be within a few inches of the surface of the ground, where the fall is less affected by currents.

CUTTING FODDER FOR HORSES.

OBSERVING RECENTLY the fine condition of the working horses belonging to E. W. HERENDEEN of Macedon, N. Y., who employs a number in his extensive nursery, we inquired his mode of feeding, in compliance with which he furnishes the following statement. It is the more valuable from being the result of accurate weighing and measuring, and not, as nearly always happens in such cases, founded on mere guessing and vague opinion:

I have tried cutting feed, by using a cylinder rawhide machine, cutting the straw about an inch long. I kept a team on the oat straw, (which was a fair crop,) which grew on less than three acres of land, from the last of August to first of April, without using a pound of hay. It was mixed with about three quarts of corn meal and bran, in equal proportions, by weight, to each horse three times per day, feeding about a bushel of cut feed at night, and a little over half a bushel in the morning and at noon.

I find that 2,500 pounds of corn meal and bran, mixed in equal quantities by weight, will last a pair of hard-working horses, and keep them in first rate condition, for three months. The hay or oats are cut rainy days and stored in a bin, and enough is always thus kept on hand to have an abundant supply.

The meal is kept in tight bins and locked, so that each teamster knows that no one but himself is using the feed, and a regular entry is made of the amount each teamster uses. I am fully satisfied, from a careful record of the amount fed teams, that the expense of feeding a team of working horses on cut feed and corn meal and bran, mixed as before mentioned, is less than two-thirds of the expense of keeping them on dry hay and whole grain. Corn meal alone, especially for summer use, is not as good for the health of horses as when mixed with bran, and, better still, with ground oats. Horses subject to the heaves, are either very much relieved, or entirely cured, while using the cut feed.

The power of digestion seems to be greatly increased by the straw or hay being cut and mixed with meal before feeding, as every part is then acted upon by the stomach; not so when thrown into that organ in a concentrated mass, which, before being half digested, is passed out.

No doubt one of the reasons why oats are so valuable as whole grain, to feed, is that the husk which surrounds the seed itself acts as a distender, so to speak, and keeps the particles of meal separated so that they are better acted upon by the gastric juices of the digestive organs. A horse working hard, uses about thirteen pounds of meal and bran per day.

MAKING BUTTER IN WINTER.

THE FOLLOWING EXCELLENT MODE is described by E. C. K. of Cape Vincent, N. Y. In adopting it we would recommend caution in using a large amount of pea-meal as a quite moderate feeding often succeeds best:

I have seen and read much in your papers about butter-making in winter, but think I have a better way than any I have yet seen. I make as much butter in winter, and of as rich color, as in the best butter times of summer. I stable my cows all cold and stormy days, (of course nights ;) have plenty of water in the yard; feed them three times a day and grain once, which is done in the morning after they have eaten their fodder. I feed ground black-eye marrowfat peas, scalded with hot water and stand three or four hours before feeding. I feed about two quarts at a time, mixed with hot water about as thick as thick gruel, and after standing three or our hours it will be as thick as corn meal pudding, and measure four quarts. Peas fed this way, especially marrowfats, are worth double the amount of any other grain you can feed, and will make cows give more milk. Well, I have told you the feeding and care of the gentlemen's department, and will now say a little about the care and management of the cream and milk in the ladies' department, which is quite as essential as any. Strain your milk, and not fill your pans more than half full, for if filled it takes too long to get sour. Then set them on a stove with a slow fire and heat them well through; the cream will rise and the pans will be fit to skim two days sooner than though they were set away cold. The cream will rise quick and sweet; therefore you will have rich and sweet butter. Generally the cream rises quick, and is not sour enough to churn, but will sour enough in your cream pail by churning time. Before you churn set your pail by the stove and heat it well through, and the butter will come half an hour sooner than though it was churned cold; and before churning scald your churn with hot water. I have tried this way of making butter until I am confident there is no better way.

PROTECTING CUCUMBERS, MELONS, &c.

AFTER TRYING VARIOUS modes for protecting melons and cucumbers from the striped bug and other insects, we find the following superior to any other. Two small twigs of osier or other slender wood, about a foot and a half or two feet long, are bent over the hill of young plants and the ends thrust in the ground, as represented by fig. 1. A newspaper is then placed upon these curved sticks covering the whole, and the edges are fastened down all around by a covering of earth as shown in fig. 2. This constitutes the whole contrivance, and affords complete protection from all insects; the paper being thin and porous, admits a sufficient supply of air and light, at the same time sheltering from cold winds. Plants thus protected have grown twice as fast as those fully exposed. Another advantage of this mode is the protection it affords from night frosts, rendering it admirably adapted to plants which have been early removed from the hot-bed. Lastly and not least, is its cheapness. A gardener will apply it to a dozen hills in as many minutes by the watch, the material costing nothing to any one who takes a political newspaper.

Fig. 1.

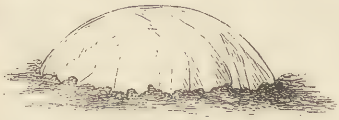


Fig. 2.

Unless the paper is very thin and fragile, heavy rains will not break it. Strong plants sometimes burst through; but a better way, when they become large, is to tear a hole in the top, as shown in fig. 3, the remaining paper at the sides still affording some protection, although plants of this size are usually safe from injury.

Fig. 3.

We obtained the suggestion from some paper, but improved upon it as above described.

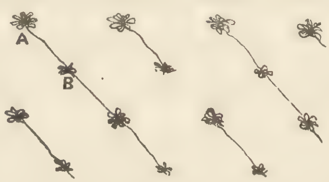
STEAMING CORNSTALKS.—A correspondent of the COUNTRY GENTLEMAN steams his cornstalks in a cheap manner, by first cutting them up in a machine, and then placing them in a bin which holds 300 bushel baskets. Over every three baskets he throws ten quarts of cold water, and then covers up the whole for twelve hours. Fermentation begins in six hours, and the food steams itself.

FRUIT DRYING HOUSE.

SEVERAL PORTABLE fruit-drying houses have been patented and constructed, one of which is represented in the annexed figure. The others are made on the same principles, and are similar in form. They are about three feet square and four feet high, but may vary according to convenience. The fruit, when the fire is made, is covered with sheet-iron, to prevent danger from taking fire. The fruit is placed on shelves, and is thoroughly and completely dried in a few hours, whether the weather be rainy or not. The cost of these houses is some $30 or $40. They are easily moved to any part of the orchard. Any one can make a portable house for this purpose, by making a small, light board house, furnished with sliding sieves as shelves, a ventilator at the top, a small stove with pipe passing around near the bottom, and double doors for access.

RENEWING STRAWBERRY PLANTATIONS.

FIRST DECIDE on the year you wish to remove the old plants. As soon as the runners have attained a length of a foot or more, select the strongest from each hill, place the end of it in the centre of the square formed by four hills, of which the hill to which the runner in question is attached forms one of the corners.



As shown in the annexed cut, A is the old hill, B the new. When the end of the runner is placed in position, sprinkle a little dirt on it, so that it will be more certain to take root. Four weeks from this time the runner will have formed a new plant, with from six to eight leaves, and a myriad of strong, healthy roots. It is best now to sever the runner, as the new plant has sufficient roots to keep it in a growing condition. Late in the fall pull up the old plants, and place them over the new ones, with a small handful of dirt on each one, to keep the elements from removing them during the winter.—*L. D. Snook.*

TRANSPLANTING EVERGREENS.

WHEN YOUNG EVERGREENS have their branches spreading out, down to the surface of the ground, as all evergreens should to look well, it is often quite difficult to dig them up for transplanting, these spreading prostrate branches impeding the work of the spade. Again, when they are set out, the same difficulty occurs in placing them properly in the hole, and filling in the earth. Having recently had occasion to set out a large number from the nursery rows, we found the work could not only be much better done, but in about one-half the time, by drawing the lower branches upwards, pressing them against the tree, and securing them in this position by passing around and tying a cord, as shown in fig. 2, the common appearance of the tree being represented by fig. 1. The ease with which the operator could now work was remarkable. Nurserymen, who have many such trees to dig, would find it to their advantage to provide a number of small straps to buckle around the trees during the operation of removal.


Fig. 1—*Tree before digging.*


Fig. 2.—*Tree dug up.*

AMOUNT OF PORK FROM A BUSHEL OF CORN.

OUR READERS may have observed the published statement of the experiments of J. B. LAWES, who obtained 100 pounds of pork from seven bushels of corn, or one pound of pork from 4½ pounds of corn. The grain was ground and moistened with water before feeding. This is regarded as successful management. At the rate of five cents per pound, the corn would be worth 71 cents per bushel for fattening pork. This estimate is based upon the supposition that the manure pays for the grinding and feeding.

The experiments of NATHAN G. MORGAN of Union Springs, published in the ANNUAL REGISTER for 1864, present much more favorable results. As a mistake occurred in one part of that published statement, we here repeat his mode and its results in a corrected form. He always commences fattening in spring, at which time a bushel of corn is more valuable in its results than in autumn, and continues a regular course of feeding throughout the season. The corn is ground and 90 pounds of hot water poured on every 16 pounds of meal, and after standing 12 to 18 hours, the whole mass becomes thick feed He finds by measured experiment that the

value of the corn is fully doubled by this process, as compared with corn fed in the ear, and fifty per cent. better than meal merely mixed with cold water. One bushel of corn thus prepared, after deducting ten per cent. toll for grinding, and leaving only 54 pounds for the bushel, will give 20 pounds of pork—or at the rate of 2 2-8 pounds of corn for each pound of pork. When pork is five cents per pound he obtains at the rate of $1 per bushel for his corn.

A coincidence will be observed between these experiments and those of Lawes as above stated. While Morgan obtains, by scalding the meal, one pound of pork from $2\frac{2}{8}$ pounds of corn—he gets 50 per cent. less, or at the rate of one pound of pork to $3\frac{2}{4}$ pounds of meal, when mixed merely with cold water, which is within less than half a pound of the quantity of meal required in Lawes' experiments, when the same kind of feed was used.

Breeds and management will of course vary the results ; in the many trials made by N. G. Morgan, he had every advantage of good sound corn, comfortable quarters, cleanliness, regularity of feeding, and quality of breed. It may be well to state that he has found the best sound corn double the value of a great deal that is used when badly grown or imperfectly ripened or more or less mouldy.

SHELTER FOR ANIMALS.

EVERGREEN SCREENS, (fig. 1,) if planted in time, form excellent shelter for animals. Nothing is better than Norway Spruce, and if the trees are planted as near as two or three feet apart, on good soil kept mellow, will make a screen twelve or fifteen feet high in five years. As the trees become older, cut off the lower branches on the side from the wind, up to a height of six or seven feet, and allow the branches above to extend outward in the form of a shed roof. By tying them down when young, they may be made to assume a drooping position, and throw off rain handsomely, like a sloping roof.

Fig. 1.

Living sheds made in this way will continue a long time, but some protection may be needed at the bottom, both for the trunks and for the foliage on the opposite side.

MISCELLANEOUS FARM NOTES.

CULTIVATING CORN.—Young corn should be cultivated as early as possible both to push on the crop and to kill the young weeds when they are small and feeble, and have not injured the young plants. An excellent mode of performing this work is to take a Shares' harrow, fix handles to it like those of a cultivator, and take out the middle tooth. Two horses will draw it, working two rows at a time, pulverizing the soil perfectly and running close to the plants without throwing the earth upon them. This is especially adapted to corn on inverted sod, which Shares' harrow pulverizes in the best manner, without tearing up the turf, as it operates like the roller and harrow combined.

ADVANTAGES OF DRILL MARKS.—The lines made by drilling in wheat, if straight and carefully and regularly made, will be useful in marking out the spaces for sowing grass seed, as well as in picking stone, sowing plaster or applying top-dressing, as they remain visible a long time afterwards. Every farmer should therefore place the drill in the hands of a driver who knows how to lay a straight furrow.

TESTING GRASS SEED.—It is of great importance in seeding down to grass, to cover the whole ground with a dense coating of herbage, with no bare spots. To do this the seed must be good. It may have been injured by age or mouldiness, or have been imperfectly ripened. Hundreds of dollars may be lost by not knowing good from bad seed. To test it, count a given number of seeds, and sow them regularly in a pot or box of fine earth, covering them a fourth or half an inch deep, according to size, by sprinkling on fine earth. Keep them moist and warm and count the number that grow, or they may be sprouted between folds of moist cotton.

RAISING CLOVER SEED.—W. Strong gives in substance in the COUNTRY GENTLEMAN the following method for raising clover seed. Top-dress with manure in the autumn previously, and plaster in spring, as ripening seed draws hard on the soil. The early or first crop must be taken as soon as in blossom ; the second, for seed, should become nearly all ripe. Cut with a mowing machine with a platform, graduated to a proper height, raking off the bunches opposite to each other at every passing, so that they can be taken in a row when loading on the wagon. If rain threatens, draw in immediately, as the ripe straw will not hurt the seed, and this will prevent the loss resulting from turning over for drying afterwards in the field. This is found to be much better and to be attended with far less waste than cutting by hand or raking into heaps, or using a pitcher. Thresh in cold, frosty weather in winter.

HOOKING CATTLE.—A correspondent of the COUNTRY GENTLEMAN prevents the injurious results of cattle hooking each other, by sawing off, with a fine sharp saw, an inch or two of their horns, and says this is as good as brass knobs, and much cheaper.

Feeding Squashes to Cows.—A correspondent of the Country Gentleman found that his cows gave four quarts of milk more per day, with the seeds taken out, than when left in—three pecks being daily fed to two cows. Another cow fattened more rapidly on three pecks of squashes cut into small pieces, than on six quarts of scalded cob-meal. The squashes made more milk and butter when the seeds were taken out than carrots ; and about the same when the seeds were left in. The variety was the Boston Marrow, with some Hubbard, both very rich kinds. The cross was thought to be better for the purpose, and to keep longer than the Marrow alone.

Cure for Foot Rot.—J. W. C. says, in the Country Gentleman, that the best and simplest remedy that he has tried consists in washing the feet perfectly clean, paring off the bad parts, and then dipping the foot for a few seconds into a small vessel of gas tar—a tin cup four inches deep, and three or four wide, will answer.

Packing Vegetables for Winter.—There are two ways in which farmers usually deposit their vegetables in the cellar for winter, one of which, we are sorry to say is too common, is to take them up without much care, and with what earth happens to be adhering to them, and to throw them into a pile in one corner or other part of the cellar, where they remain till wanted for family use. We here allude to such vegetables as beets, carrots, parsnips, turnips, &c. If the cellar happens to be damp, many of them decay or lose their flavor ; if it chances to be a dry one, a portion of them become shrivelled and too dry for use. The heaps are overhauled repeatedly to find such as are good enough for the table, and these confused and scattered heaps present anything but a tidy appearance, while the decaying ones produce an unhealthy air.

We have adopted another way, which we like much better. A few bushels of fine clean moss is obtained from dense woods or from swamps. Clean barrels or smooth-planed boxes, are taken to the garden, (a dry day being selected for the occasion,) and the vegetables being taken up, well cleaned, topped and trimmed, are placed in the barrels or boxes, with alternating layers of soft, damp moss. When filled, the handcart or wheelbarrow conveys them to the cellar. The moss keeps them clean and sufficiently moist, preventing the accumulation of water on the one hand, and the drying and shrivelling of the roots on the other. They are always fresh and ready for use, and are taken out from under the moss without the least difficulty. As the barrel is successively emptied, a portion of the moss is taken off and placed in another one for future use.

There are very few places where good moss cannot be obtained from the woods, within a reasonable distance ; but if beyond reach, clean, moist sand may be substituted for the purpose of retaining the moisture. It is, however, heavier and more difficult to handle, and the vegetables do not come from it so clean and fresh as from the moss.

HOT-AIR FURNACES.

HOT-AIR FURNACES FOR BURNING WOOD have been used to some extent by country residents; but formidable objections have existed in the amount of labor and attention required to feed and regulate them, and in their liability to become choked by the accumulations of soot. When this soot has accidentally caught fire, it has endangered the building, unless special precaution has been taken to remove every combustible substance from the pipes and flues, in its erection. The use of anthracite coal is not attended with these objections; the ashes and dust are confined to the furnace room in the basement. The combustion is steady and long continued, and is thus easily regulated, and no soot being formed, the furnace is easily cleaned, and is not attended with danger by taking fire. Where it is desired to occupy several apartments of the house, it is decidedly more comfortable, as well as economical, to use a hot-air furnace for burning coal.

In order that such of our readers as may desire to erect furnaces, or to know how to manage them, may understand their mode of operation, we give the accompanying sketch of the section of one of the best for burning coal now in use. The place for the fire is shown at *a*, fig. 1, and is easily filled with coal through the door immediately above, while the ashes are taken out through the door of the ash-pit below. The smoke passes through the pipe *b*, into the chimney — the whole being made of cast-iron, except the pipe. This

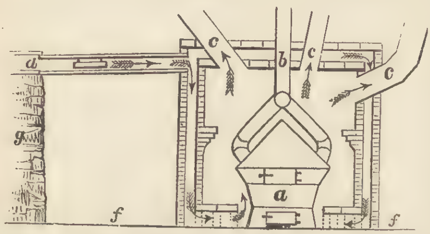


Fig. 1.—*Hot-air Furnace—a, furnace; b, smoke pipe; c, c, c, hot-air pipes; d, cold-air tube; f, f, cellar floor; g, cellar walls.*

heating apparatus is enclosed in a brick air-chamber made with double walls, and from it the hot-air pipes, *c*, *c*, *c*, pass into the different rooms above, the supply of heat to each room being regulated by registers placed on a level with the floor, or sometimes in the side walls. A space four or five inches wide, between the double walls, admits the cold air to the lower part of the furnace. This air enters through an opening or window in the cellar wall, passes through the large wooden tube, *d*, into the upper part of the air space in the walls of the air-chamber, and immediately descends by its weight, as already stated. A brick floor or shelf surrounds the lower part of the furnace, and approaches within a few inches of it, so as to throw the cold air more immediately into contact with the heated iron. This shelf is supported by bricks standing on end, as shown by the upright

dotted lines. Projccting brick shelves about half way up again throw the ascending air against the sides of the furnace. The man-hole door for entering the air-chamber in case of necessity, and for filling the water pan, (employed to render the air more humid,) is placed on the rear side. It is made of sheet-iron, lined within with sheet-tin, with an enclosed air space about two inches thick, to render it a non-conductor.

Fig. 2 represents a portion of the cold-air tube with a sliding board, *a*, to cut off the admission of air from the outside in time of high wind, or to prevent the hot air from being driven outward through it when strong winds prevail on the opposite side. When thus closed, the door, *b*, should be opened for the entrance of air from the furnace room or basement. The cold-air pipe should always be placed on the side toward the prevailing winds; and when these winds are strong, it will be necessary to partly close the tube by the sliding board *a*. It will also be desirable to close this tube in part, when in mild weather the fire is moderate or small.

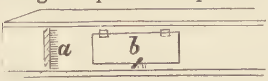


Fig. 2.—*Cold-air tube on a larger scale—a, slide for cutting off or admitting air from without; b, door for admitting air from cellar to furnace, on windy days, when necessary.*

As a furnace must necessarily be placed in a basement, attention should be given to make it easily accessible from above, unless in charge of an attendant occupying the same floor.

DRAWING SAND FOR GARDENS.

A LARGE PORTION OF THE SOILS devoted to gardens in this country, would be improved and rendered lighter by an admixture of sand. In all those regions where clayey soils prevail, gardens thus treated would be rendered more readily friable, and could be worked earlier in spring. A coating of two or three inches, spread over the surface and gradually intermixed by cultivation, would, in many instances, effect a great improvement. A great advantage which this mode of treatment possesses, is the *permanent* character of the improvement. When a soil is merely enriched with manure, it gradually loses its richness as the manure disappears, but the sand, applied artificially, does not disappear, but remains for centuries. The best garden soil we have ever cultivated, was made by drawing sand on a strong or heavy loam. Soils that are naturally light, sandy or gravelly, frequently do not possess sufficient strength to retain long the manure applied to them. A proper admixture of the two ingredients is always the best.

At the present season of the year—or in the depth of winter, when teams would otherwise be standing idle,—this work may be done to advantage. In clay regions, beds of sand may be generally found within a reasonable distance. After breaking through the frozen crust, the sand may be easily shovelled out for drawing. A few bundles of straw, thrust in at the mouth of the open pit, on the approach of severe nights, will prevent severe freezing until the next day.

ITEMS IN DOMESTIC ECONOMY.

Leaks in Roofs—May be stopped by a cement or paste made of white lead paint thickened with fine clean sand. If not exposed to the sun, larger cracks may be stopped by a mixture of gas tar and sand.

Cisterns.—A couple of live fish thrown into cisterns will clean them of worms and dirt.

Filter.—A cheap temporary one may be made by taking a large sized flower-pot, or any other earthen vessel which has a hole in the bottom. First place in the bottom a layer of pebbles, another of smaller ones, and then one of coarse sand, and lastly a layer of charcoal, broken into fine grains, but not powder. A piece of clean flannel extending up the sides of the pot, should cover the charcoal. More complete and permanent filters are figured and described on page 106 of RURAL AFFAIRS, vol. III.

Lamp Explosions.—Many of these may be prevented by trimming the wick daily. When burned fo' several evenings without trimming, the wick becomes blacked, clogged, and incapable of supplying the oil clearly and uniformly, and the chimneys are sometimes filled with flame and smoke, to the embarrassment and alarm of those present. Some explosions would be prevented by never blowing out the lamp down the chimney—for if the wick happens to be too small, the flame may be driven down into the oil. The best way is to turn it down with the button until extinguished.

To Wind a Watch—Turn the hole downward, and let the point of the key point upward. This will allow any little particles of metal or dust to drop out, and the watch will not need cleaning so often.

Buckwheat Cakes, as every one knows, are best when taken hot and fresh; but sometimes they remain, become cold, and are thrown away. These cold cakes may be rendered excellent by taking a suitable quantity of milk, and adding to it say one-twentieth part of its bulk in butter, and heating the two together over the fire till hot, but not scalding; and then laying in the cakes and turning them over.

Fire in Chimneys may be arrested in a great measure by throwing salt on the fire below, which partly extinguishes the flames; stopping the chimney at the top arrests the current and contributes to the same result. It should be constantly impressed on the mind of every person that whenever a dwelling takes fire, every door should be kept closed to prevent the flames from spreading.

Stair Carpets may be preserved a much longer time by placing strips of paper nearly as wide as the carpet and five or six inches broad, over the edge of each stair, which prevents the wearing at that place.

Cleaning Knives.—A correspondent of the COUNTRY GENTLEMAN says: A small, clean potato, with the end cut off, is a very convenient medium of applying brick dust to knives, keeping it at about the right moisture, while the juice of the potato assists in removing stains from the surface. We can get a better polish by this method than by any other we have tried, and with less labor.

Hair Brushes are best cleaned by washing them in saleratus or soda water which removes all the oily coating.

Kitchen Odors.—Meat which has been slightly tainted may be restored to perfect sweetness, and the odor arising from it while boiling entirely prevented by throwing into the pot a few pieces of charcoal contained in a small bag. The odor of vegetables slightly affected, may be prevented in the same way. Red pepper, and even black pepper, produces a similar but less perfect result.

Rancid Butter, boiled in water with a portion of charcoal, (say a tenth part,) will be entirely divested of its rancidity and may be used for cooking purposes, although its fine flavor will not be restored for the table.

Wall Paper may be readily cleaned by rubbing it with dry Indian meal on a cloth. Pieces of bread are commonly used for this purpose, but the Indian meal is obviously cheaper and easier.

Pegged Shoes, made of light or thin material, often have the soles crack off at the concave part before the shoes are half worn out. This is owing to the pegs becoming dry and shrinking. To prevent it, avoid thrusting them against stoves, or standing on hot-air registers; at the same time keep them somewhat moist, by occasionally walking on wet ground. If this is not a sufficient remedy, drive a few copper tacks at the place of the pegs and clinch them inside. They may be bought at hardware stores, and kept for this use—a half dozen will do for each shoe.

A Self-Holder for a Spoon, when temporarily filled with any liquid, or for dropping medicine, may be made in the simplest manner possible, by thrusting the handle between the leaves of a shut book lying on the table. If not high enough, one book may be piled upon another. Both hands may then be used in dropping from a bottle or making any desired mixture.

Cleaning Dinner Plates.—Every dish-washer is familiar with the process of scraping adhered portions of gravy, etc., from the surface of the plates preparatory to washing. The rounded edge of a common table knife does the work imperfectly. Skillful housekeepers inform us that long, straight, flexible blades, like the spatula of druggists, perform this work more rapidly and perfectly. A task which has to be done three times a day, or more than a thousand times annually, should have every appliance for rendering it easy and perfect.

A Valuable Remedy.—Dissolve *chlorate of potash*, at the rate of a teaspoonful in a tumbler of water. It is an admirable remedy for any kind of sore throat, particularly ulcerated sore throat, if taken as a gargle. Will speedily cure chapped hands, or other skin disease. A few grains taken into the mouth and dissolved slowly, answers about as well as a gargle.

To Clean a Clock.—When the clock stops, don't take it to the repair shop till you have tried as follows: Take off the pointers and the face; take off the pendulum and its wire. Remove the ratchet from the *tick* wheel and the clock will run down with great velocity. Let it go. The increased speed wears away the gum and dust from the pinions—the clock cleans itself. If you have any pure sperm oil, put the least bit on the axles. Put the machine together, and nine times in ten it will run just as well as if it had been taken to the shop. In fact this is the way that most shopmen clean clocks. If, instead of a pendulum, the clock has a watch escapement, this latter can be taken out in an instant without taking the works apart, and the result is the same. It takes about twenty minutes to so clean a brass clock and saves a dollar.—N., *in the Country Gentleman.*

To Prepare Bees' Wax.—To obtain wax, boil the combs in a strong muslin bag, in a saucepan, with water enough to keep it from burning; and whilst boiling, continue to press the bag with a wooden slice or spoon, to extract the whole, as you skim off the wax. Drop the wax into cold water, where it will swim on the surface. The wax thus obtained will still want refining, to effect which place it in a clean sauce-pan, and melt it over a slow fire. Then pour off the clean wax into proper vessels, and let it cool. To whiten it, make it in thin cakes, and expose it to the sun.—*N. Y. Coachmakers' Magazine.*

Cooking the Cauliflower.—Put a good sized cauliflower in just enough *boiling* water to cover it, with a large teaspoonful of coarse salt, and a piece of carbonate of soda the size of a moderate green pea, and boil for twenty-five minutes; then dish and drain out all the water, and put two ounces of butter on top of the cauliflower, and cover close.

Pickling the Cauliflower.—A correspondent of the Country Gentleman says: Have a kettle of boiling water, and put in one at a time, with top down, unless the kettle is large enough for more, and boil it until tender. Have ready a jar of cold vinegar, with cloves and mace; drain the cauliflower well and put into the vinegar while hot. Cover tightly, and it will be ready for use in a week or ten days.

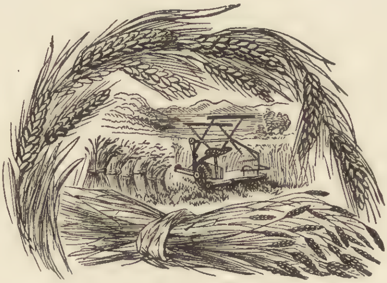
Another correspondent gives the following directions: Take those that are very tender; *break* in pieces the size desired (not cut;) sprinkle with salt on an earthen dish, and in four hours remove to jars of strong, cold, spiced vinegar, previously prepared.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.



CULTURE OF WHEAT.

EVERY FARMER naturally asks himself the question—How can I secure the largest amount of this great leading grain crop? Answer—Examine and imitate the best practices and the modes of culture adopted by those who uniformly obtain the largest returns. There are a few successful managers who raise from fifty to one hundred per cent. more per acre, than the average crops of the country. It is well worth while to look into the secret of their success. If their practice could be imitated so as to add fifty per cent. to the four hundred million dollars worth of grain raised annually in the country at large, by an addition of two hundred millions more, it would be worth some little trouble to reach this desirable result. We propose to devote a few pages to an examination of these best practices.

The requisites for success naturally divide themselves under four heads:

1. A good and suitable soil.
2. The best varieties of wheat.
3. Preparing the soil, sowing and general management.
4. Avoiding diseases, insects and other disasters.

SOILS.—There are certain districts of the country widely known or cele-

brated as being excellent wheat regions ; and there are others where it is supposed wheat cannot be profitably grown. There is no question that the common belief that the wheat crop is not adapted to certain places, has been at least partly owing to bad management. When the country was new and the soil fresh and productive, good crops were obtained with little difficulty. General success led to carelessness ; grain was sown after grain, without regard to a proper rotation, and the soil became gradually exhausted, and filled with weeds. This pernicious course was much practiced in the best wheat regions of Western New-York, and the crops became so reduced that some went so far as to predict the entire failure of wheat raising. But by the adoption of underdraining, cleansing rotation, and enriching by clover, and a judicious application of manure, many have succeeded in obtaining a gradual increase in successive years, until the original amount yielded by the new, fresh and rich soil has been exceeded. Experiments of late years have proved that many portions of the early settled States, where the culture of wheat was long ago discontinued, will yield good and remunerative crops under proper management. It is a common opinion that the best wheat soils are those which contain a large portion of clay—commonly designated as *strong* soils. This is true to a great extent, but such soils nearly always require regular underdraining. It is

Fig. 2.—*Wheat on Undrained Land, Growth Feeble—a, Top Soil, mostly Dry; b, Water Soaked Soil; c, Wet Subsoil.*

Fig. 3—*Wheat on Drained Land, of Strong Growth, the Water being Three Feet Down and below the Roots.*

obvious where the whole field has to get rid of its surplus water by the slow process of soaking away through the particles from one side of the the field to the other, or by the equally slow process of evaporation, a fatal loss of time must often result—all of which is obviated by providing

artificial means for a swift discharge in twenty-four hours of time, through regular channels of tile. Winter killing is obviated, manure is made accessible to the plant, and a deep mellow soil takes the place of the heavy, water-soaked or baked earth of the undrained farm. (Figs. 2 and 3.) Although light soils do not usually produce the heaviest yield of grain, yet the facility with which they are improved by rotation and clover, give them some advantages—so that, on the whole, more depends on good and proper management and adapting the system to the peculiarities of the soil.

Sometimes important advantages result from an intermixture of the subsoil with the surface. A farmer in Cayuga Co., N. Y., increased his wheat ten bushels more per acre, by running the plow two inches deeper than it had ever been before—thus throwing up and intermixing a small portion of the subsoil; fig. 4. A larger intermixture did not succeed so well until a few years' exposure to the air had changed its character. Another farmer, in Wayne Co., produced a like beneficial result by scattering the earth from a ditch over the adjacent land. Some years ago John Johnston of Geneva made the following statement of a striking result of a similar character: "A few years ago I had some 800 oak and black walnut stumps pulled; many of them brought up earth from four to six feet deep, and from ten to seventeen feet square on the surface. The first year after the stumps were pulled I put the field in wheat. Where the stumps stood the wheat was not so good as the other part of the field, but it is again in wheat now and I never saw any such wheat as is on the places where the stumps were pulled. You can see where every stump had been; the wheat is all of ten inches taller, stands far stockier on the ground, and looks as if a load of barnyard manure had been laid down and not half spread, and wheat sown on it; the straw is stiff and bright." This treatment will not be applicable to all soils, but only to such as experiment points out as having an enriching subsoil, when intermixed in moderate quantities.

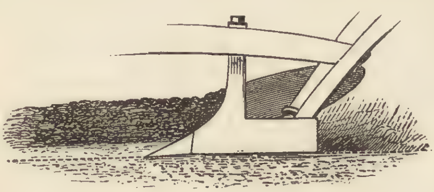


Fig. 4.—*Gradual Deepening of the Soil by Trench Plowing.*

VARIETIES.—Before the appearance of the wheat midge, the Soule wheat was one of the most popular and valuable sorts throughout a large portion of the Northern and Western States. The wide destruction produced by this insect led to the general introduction of the Mediterranean, which was found commonly to escape. This sort has now been cultivated many years, and from the success which has attended its crops, it has no doubt proved in the aggregate worth hundreds of millions to the country at large. The Blue Stem, a smooth, red variety, is an old, well known sort largely cultivated for the South. There is also a white variety by the same name, con-

siderably resembling the old white Flint. The straw having a bluish cast below the head has given it this name. The Lambert is a newer sort, more lately introduced, and much cultivated in portions of the West. It is a red chaff, bald wheat, of good but not of the highest quality, ripening a little earlier than the Mediterranean, and remarkable for its entire freedom from the attacks of the midge. The Early May has been a very popular sort at the Southwest; but although promising well for a time in some places, on its introduction into the North it has not generally succeeded, and has now nearly passed out of cultivation. It is a white bald variety, but not quite so white as the Soule. The Diehl wheat is a new sort not yet sufficiently tested to prove its standing, but recommended by some for its earliness, freedom from the midge, and general value. It is a bald, white wheat, with a short straw and short head. Some reports are unfavorable. There are two other new sorts which have been considerably raised in Central and Western New-York, and which in particular localities have given high promise of productiveness and value. These are the Wicks and the Treadwell. The Wicks wheat is a bearded variety, the beards more spreading than in the Mediterranean and the heads whiter in chaff and grain, which are rather long and slender. The Treadwell is a partly bald wheat, is not so white as the Wicks, but appears to be more uniformly productive, and has a firm, erect straw—the Wicks in some localities not succeeding so well as the old Mediterranean, but proving much superior to it in others.

There are in all hundreds of named varieties of American and foreign origin which have been more or less tested in this country, most of which have proved of no value, and very few equal to the sorts already mentioned. As the crop is yearly reproduced from seed there is a constant tendency to a change of character, and hence the importance of continually selecting the best for sowing. There are various modes of making the selection. A good one is to pass through the field just before cutting and select the largest, best and ripest heads; sow the grain from these, and repeat the process annually. Another is to provide a special screen for the fanning mill, which shall allow all the grain to pass through except the largest and plumpest. Another mode is to throw the wheat by handfuls across the barn floor—the largest grains will be thrown the farthest, and thus separated from the rest.

It is equally important to clean out foul seed. The late improvements in the fanning mill are such as to accomplish this result without much difficulty. Some farmers clean out the chess and some other seeds by floating them on brine made just strong enough to effect the purpose and allow the wheat to sink—pouring off the floating matter and allowing the wheat to remain. The brine, which should be strong enough to float a potato, may be used several times. It is an old practice, successful to a considerable extent, to blow out the light seed, whether of weeds or the shriveled wheat grains, by removing the shaking rod from a fanning mill, so that the fan may be driven with greater velocity, taking out the unnecessary sieves, but allowing the lower one or screen to remain. One person turns

the fan rapidly while another regulates the discharge at the hopper. All the lighter stuff is blown out behind, and small, heavy seeds, like those of cockle, drop through the screen into the box below. Confining the blast from the fan by means of a large square board box or tube, assists in performing the operation with greater ease and efficiency.

PREPARATION OF THE SOIL—ROTATION.

For the purpose of bringing the soil up to a proper condition, and maintaining it in a fertile state, and free from weeds, nothing is more important than a well-planned rotation, including at least one hoed crop. The following courses have been adopted in the best wheat districts of Western New-York:

COURSE FOR A STRONG FERTILE SOIL

1st year, Corn on clover sod.
2d do. Oats or barley.
3d do. Wheat.
4th do. Clover, mowed and cropped for seed.

This, it will be seen, is a four-course system, and is adapted to farming where raising crops is the principal object, and where there is a portion of permanent pasture on moist land. If the whole farm is well drained, a five year rotation may be adopted by seeding to both timothy and clover after the wheat, and by one year of pasturage after the mowing. It is important that the corn be kept well cultivated and perfectly clean. This will serve to eradicate such weeds as obtain a foothold in fields kept several years in grass, or in grass and sowed crops alternately. It is also important that one good crop of clover be plowed in during the course, in order to maintain fertility. The manure may be applied to the corn or the wheat, according to circumstances. If for the corn, the best way is to draw it out in winter as fast as it is made, and spread it broadcast and evenly at once. Much of it will soak into the soil, and it will be worth nearly twice as much as if kept till spring and applied just before planting. Such of the manure as may be too coarse, should be kept in heaps and turned over once or twice during summer, to be applied as a top-dressing after the land is plowed and before the wheat is sown. This application not only increases the wheat several bushels per acre in most instances, but it assists the catch of the clover seed, and pushes the young clover plants forward. If the soil is very rich, this top-dressing may promote the growth of too much straw; but such cases are much rarer than the opposite difficulty.

On soils not quite so strong as the preceding, or where it is desirable to increase the fertility, the following course would be better:

1st year—Corn on sod.
2d year—Barley, followed by clover not cut nor pastured.
3d year—Clover plowed under when full grown, the sod rolled flat, pulverized with a two-horse cultivator, and sown with wheat.

4th year—Wheat.
5th year—Clover meadow.
6th year—Pasture.

It will be seen that only two tillage crops are allowed in succession, and that two green crops are plowed under during the course. This system allows the feeding of a considerable number of animals and the consequent manufacture of manure—the application of which to the corn or to the wheat, as may be required, in addition to the green crops, will maintain almost any soil in a condition for raising good crops of wheat.

It was formerly a practice in some of the best wheat districts to take off a crop of wheat and plow under a crop of clover every alternate year—thus forming a two-course system, with an enriching crop every second year. This appeared to do well for a time, but as there was no hoed crop, the ground often became infested with foul weeds, and a greater variety was found better, not only for the land, but for the purposes of a general mixed husbandry. It is a common opinion that oats after corn, and preceding the wheat, is more exhausting to the soil, and less favorable to the wheat, than barley; but some successful managers think this difference is entirely owing to the profusion of young plants which spring up from the oats scattered at harvesting. These crowd the wheat like weeds, and diminish its vigor until the oats are winter killed. Different expedients are therefore resorted to, to prevent this autumn growth. One is to turn in a large herd of swine as soon as the crop of oats is removed. Another, applicable only to moist seasons, is to harrow well the whole surface, so as to cause the oats to germinate before plowing under for the wheat. The harrowing will render the plowing more complete and perfect by the pulverization thus effected. A third method is to plow under the scattered oats with very shallow furrows, and after they have come up, to turn the whole under by deeper plowing preparatory to sowing the wheat. A fourth, and perhaps the best of all, is to plow first the whole field of oats stubble by what is termed the cut-and-cover process—the furrows being twenty inches or two feet apart, throwing out enough earth to cover the unmoved strip of ground a foot or more in width on the right hand of the plow. A good two-horse team will plow in this manner several acres a day. The whole is then harrowed, and unless the soil is extremely dry, the scattered seed will nearly all come up in a few days. It is then plowed under and the wheat sown. Where this course has been adopted, no perceptible difference has been seen between wheat after oats and after barley, the two growing side by side.

SUMMER FALLOWING.—This practice is unnecessary in the rotation already described, if the soil is clean and in good condition—in which case a summer crop of barley, oats, spring wheat or peas may occupy the ground that would otherwise be idle. But if the land contains many weeds, or is hard and requires thorough pulverization, summer fallowing, with two or three good plowings, and twice or thrice as many harrowings, produces an excellent effect. Under this treatment the earlier the manure can be applied,

the more thoroughly it will become intermixed. Experiment has been made by applying it on the sod in spring, turning it under at the last plowing before sowing, top-dressing after plowing but before seeding, and top-dressing early in winter when the ground is frozen. The spring application produced the best results.

MANURES.—The wheat crop needs a large supply of nitrogen, and such manures, therefore, as contain ammonia largely are the best. Stable manure, from animals fed on grain, or yard manure from cattle fed on clover or oil-cake, prove very efficient applications and much better than manure from straw fed animals only. The use of unadulterated Peruvian guano has greatly increased the amount of grain in some districts ; but whether it would prove generally profitable under existing prices can be only determined by experiment and weighing and measuring. The application of a few bushels of salt per acre, although varying in its results, has generally proved beneficial by increasing the amount a few bushels. On some soils it has had no visible effect.

MANURING THE SURFACE.—There are very few soils where the crop is not greatly benefited by top-dressing with manure after plowing, and before the wheat is sown. The amount required for this purpose need not be so great as the usual application in manuring. It should, however, vary with the previous richness of the soil. If already quite rich, a thin dressing, just sufficient to give the young clover a good start, will be enough. On poorer soils, ten or twenty two-horse loads will not be too much. It should be evenly or uniformly spread, and for this reason old or fine manure is commonly preferred. Long or fresh manure will answer an excellent purpose if it has been forked over and well broken up, and it has the additional advantage of protecting the surface of the earth from the winds of winter by its straw or coarse fibre. A common practice in some places is to draw out the coarse spring manure, which is largely filled with straw or cornstalks, and deposit it in large heaps as near the intended place of application as practicable. Here it undergoes a necessary rotting down, and if there is much straw, the outsides of the heaps should be cut down with a hay knife and thrown together on top. While the last plowing for the wheat is going on, this manure is drawn in successive portions on to the newly plowed land—thus preventing the treading and hardening of the surface by teams, if left till the whole field were plowed.

PREPARING OLD SOD.—In the eastern portions of the United States, where the land is hardly rich enough for the course already described, good crops of wheat have been raised by planting on the inverted sod of old pastures. It is performed in the following manner : The sod is first turned over evenly and uniformly to a good depth. Of course, fields must be chosen that are clear of stumps and large stones. The furrow slices should be laid flat and not lap. A roller is then passed over the whole, and the inverted surface made mellow by the use of a two-horse wheel cultivator. Shares' harrow would probably accomplish the same end more perfectly.

There may be conditions of the soil that would obviate the necessity of rolling—such, for example, as a heavy or clayey nature and a moist situation. If the succeeding summer should happen to be quite wet, the omission of rolling would afford partial underdrainage, but it would be better not to sow at all on land inclining to be wet, or which would not bear thorough rolling. As soon as the rolling is completed, top-dress the whole surface with fifteen or twenty loads of manure, and spread it evenly and perfectly. If the soil is rather light in character, it is important that this top-dressing be applied before the cultivating is given. If on the other hand it is quite strong or clayey, it will be as well to apply at least a part of it after the surface is pulverized, or even after the sowing of the seed, as it will thus protect the surface and tend to keep it from crusting. Rolling the whole just before sowing, if the drill is used, enables the operator to deposit the seed at a more uniform depth than on a rough and uneven surface ; the practice also leaves uniform furrows at each drill, thus affording protection to the young plants in cold weather by their being below the sweep of winds. For the same reason these furrows should be across the direction of prevailing blasts, if the field happens to be in a windy situation. The crumbling of frost and the rolling or harrowing of the field early in spring, fill up these small hollows with fresh earth, which benefits the plants.

Fig. 5.—*Section of Drills Showing the Furrows.*

DEPTH OF SOWING.—In a light loose soil the depth may be greater than in one more heavy and compact. A greater depth is required during a time of severe drouth than when the soil has a good supply of moisture. As a general average, a depth of two inches is enough. One inch would be better if the soil were sufficiently moist ; but it is difficult to get a drill so as to deposit the seed uniformly so shallow. Some years ago the writer of this article performed a number of experiments with the following results—the depth being carefully measured, and the soil laid on the seed wheat in an even stratum :

Planted	½	inch deep,	the plants	came up in	5	days.
do.	1	do.	do.	do.	6	do.
do.	2	do.	do.	do.	7	do.
do.	3	do.	do.	do.	8	do.
do.	4	do.	do.	do.	10	do.
do.	6	do.	do.	do.	12	do.

Five weeks afterwards there was no perceptible difference in that planted half an inch and an inch deep ; that planted two inches deep was not quite so good, so on decreasing in quality as the depth of planting increased. At six inches there were but very few slender stalks. As the crop approaches maturity the difference between the shallow and deep planting becomes less obvious—so that one inch and three inch planting are not greatly different in their results, although the deeper planting is a little later in ripening, and is hardly so productive. For this reason wheat planted with a good drill on well prepared and rolled ground, where it

may be put in with great evenness, ripens more uniformly, and brings a rather better return than wheat sown broadcast and covered with a harrow at all different depths. For the same reason twenty-five per cent. in seed is saved by using the drill. That is, a bushel and a half per acre will answer the same purpose, if properly drilled in, as two bushels sown broadcast and harrowed. Before the introduction of the wheat drill the practice had been adopted by some farmers of plowing in wheat. This succeeded well on light, porous or gravelly soils, with plowing so shallow as not to cover much more than three inches deep, but the practice was inapplicable to heavy and compact soils. Covering with a gang plow was also in successful use, but the process was much slower than with a drill, besides requiring sowing the seed previously by hand. The drill is so much more expeditious, and does the work so much better, that it is universally adopted in the best wheat growing districts—where one may drive all day without discovering a single field of broadcast sown grain.

Fig. 6.—*Strong Growth of Young Stool Sown Shallow.*

Fig. 7.—*Young Wheat Plant from Shallow Sowing, with Strong Roots.*

Fig. 8.—*Young Wheat Plant from Deep Sowing, with Feeble Roots Below and Striking New Roots near the Surface.*

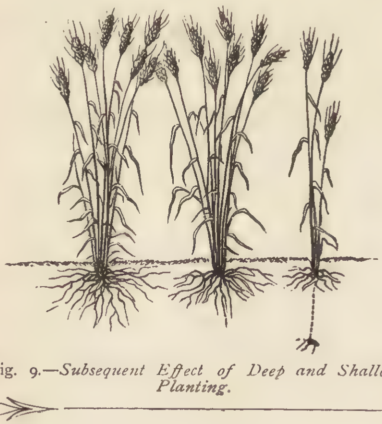


Fig. 9.—*Subsequent Effect of Deep and Shallow Planting.*

Harrowing in Spring.—The practice of harrowing the whole surface of the field early in spring, although adopted by some farmers many years ago, has not come into general use, and yet it has always been attended with good results, provided the ground was sufficiently dry at the time and a light, fine tooth harrow was used for the purpose. Although the young plants of the wheat appear to be rather roughly treated, yet scarcely any are ever torn out or seriously injured. The breaking of the crust, mellowing the whole surface, and the destruction of small weeds, all of which are well known to be beneficial in all hoed crops, cannot fail to assist the growth of wheat. It also prepares the ground for the reception of grass seed, which may be rolled in, and will be more likely to take than on a hard crust.

Winter-Killing.—On some soils and in some localities the destruction of the crop by freezing out, is a formidable drawback to the culture of this crop. Heavy, wet or undrained lands are most liable. Nothing is better by way of prevention, therefore, than thorough underdraining. It has not only doubled or tripled the crop in many instances, but has effected an insurance against this disaster. Sometimes winter-killing occurs on dry land much exposed to sharp wind, and when little snow has fallen. Top-dressing with manure at the time of sowing, or on the first freezing of the soil in winter, has proved valuable. Even a thin coat of straw, just sufficient to break the force of cold winds, has had an excellent effect. An experiment occurred under the eye of the writer, where a portion of a field sown with Mediterranean wheat, (which is more liable to be injured in this way than some other sorts,) received a thin dressing of straw, the other part remaining exposed. Winter-killing was unusually severe that year, and the whole of the exposed portion was so fatally injured as to be not worth cutting, while the other part yielded about twenty bushels per acre.

Where heavy or wet land has not been underdrained, some protection is afforded by plowing the ground into narrow "lands" or ridges eight or ten feet wide, and so laid that the dead furrows between them shall make the shortest discharge in the direction of the descent. This, however, is but a partial remedy—as well as another practice of turning over such land when in sod, partly lapping the furrows running in a similar direction down hill, so as to drain off the water from the inverted sod above.

Time for Harvesting.—A general practice is to cut wheat too late, or when it is dead ripe, with the heads bent over and hanging downward. A better time is five or six days earlier, or before the heads droop much, or while the grain is in the dough state and the tips of the chaff are yet green. Careful experiments, in connection with accurate weighing, performed by the writer, proved that wheat cut thus early was slightly heavier than when cut later, and millers stated that it made more and better flour for a given weight. The straw, if well dried, is better, brighter and more valuable for feeding. It is true the straw is somewhat heavier, requires a little more labor and tight binding on account of shrinkage in drying ; but

these are overbalanced by the less amount of waste in the harvest field. Since the introduction of reapers the time is more completely at the control of the farmer, and the crop should be secured at least two or three days before the usual dead ripe period.

In regions where showers are frequent, it will be found most economical to insure a perfect condition of the grain by placing it in water-proof shocks as soon as cut. There are two modes of making shocks—in a small round shape, and larger and oblong. The smaller ones are made by placing six sheaves firmly on the ground, with the tops drawn closely and compactly together. A seventh is then bound very tightly near the butts and the straw broken down all around before placing it in an inverted position on the top of the shock. The straw of the cap is then spread evenly all around, and pressed against the tops of the sheaves within—forming a perfect covering against any rain, however heavy or long continued. The oblong shocks are made by placing ten sheaves in a double row, the opposite ones against each other. Two caps are then put upon each shock. A good farmer and careful observer stated that in harvesting a large field, he placed a part of his wheat in these capped shocks and another part in double rows exposed to the weather. A rain of several days continuance followed, and all the exposed grain was nearly ruined by sprouting, while the capped portion came out as bright and as fresh as if the skies had remained cloudless through the whole.

At the time of threshing, care should be taken to secure the straw well from the rain, that when used, either for litter or for feeding, it may come out bright, fresh and uninjured.

Spring Wheat.

Spring wheat has occasionally proved a successful crop, but has not been largely cultivated for a great length of time in any district of country. As the flour does not bear distant shipping so well as winter wheat, it is more particularly adapted to home consumption. It may sometimes be sown with advantage when circumstances have not permitted the sowing of a winter crop the previous autumn. A good clover sod turned under in autumn and thoroughly mellowed, by means of a horse cultivator, in spring, is a good preparation; it also succeeds well on well pulverized soil after corn. A medium loam is found best; very light or very heavy clayey land not succeeding so well. The practices of sowing very early, so as to escape the midge, or quite late, so that it may ripen after the midge is passed, have both been adopted, but the early sowing has commonly done best. The most popular varieties have been the Fife, Club and China Tea. The China Tea has been the favorite variety in Western New-York. It has a white chaff bearded head, which is long, the kernels not very close together, with a large grain. The Canada Club is an early sort, but is not nearly so tall as the China Tea. The heads are rather close and compact. The Fife is rather taller than the Club, but not so much so as the

China Tea. It succeeds better on lowlands than other varieties. The straw is strong and stiff, and seldom lodges.

Diseases and Enemies.

These may be classed under four different heads, namely—1. Winter-killing. 2. Smut. 3. Rust. 4. Insects, including the Hessian fly and the midge—the chinch bug and some other insects have proved destructive in certain localities.

Remedies for winter-killing have been already pointed out; but it may be well to speak briefly of a pernicious weed which almost invariably springs up on winter-killed patches. This is chess, or cheat—*Bromus secalinus* of botanists. It is a very hardy plant, growing from a small hardy seed. The plant when shaded by wheat is often only a few inches high, bearing a few seed, and entirely unobserved by the farmer. But when the wheat is destroyed, the chess has all the space, and each plant springs up several feet high, bearing thousands of seeds. Plants have been found in shaded places only two inches high and reproducing seed; and again, when entirely unshaded, from three to five thousand grains have been counted on a single root. Nothing is therefore more natural than for careless and superficial cultivators to come to the conclusion that the wheat, being partly killed, has changed to chess. But as the two plants belong to different genera, such a change is impossible. The seeds of chess, on account of their small size and hardiness, are often scattered in the soil in manure, foul seed, droppings of animals, from itinerant threshing machines, and in various other ways unperceived; but farmers who have taken special pains always to sow perfectly clean seed, have succeeded in a few years in eradicating the chess plant entirely from their farms.

2. Smut.—This is a fungus which takes possession of the grain and reduces it to a black powder. The microscopic seeds of this fungus plant become attached to the seed grain in large numbers, and ascend through the sap vessels of the growing plant, producing smut in the new heads. It is easily prevented by washing the seed wheat. If there is much smut, the wheat should be first washed in water, which may be done in tubs by stirring the water and wheat together, pouring off the blackened liquid and adding fresh portions until it runs clear. Then wash in brine, spread on a barn floor, and dust with dry, powdered, water-slaked lime, stirring the whole together. If this seed is now sown, no smut will be reproduced from it. If the seed wheat is but slightly infested, the washing with water will not be necessary. A solution of blue vitriol has been found very efficient in destroying smut; but in ordinary instances, brine answers the purpose. Smut is often carried from one farm to another by means of itinerant threshing machines.

3. Rust—When slight, does little injury, but in its more severe or extensive attacks it covers both surfaces of the leaves, the stubble, straw and chaff, first imparting a yellowish, then a brown, and afterwards nearly a

black appearance. It is a small, microscopic plant or fungus, the seeds of which are distributed through the sap pores. These seeds produce young plants under the epidermis or skin of the wheat —which they swell and burst in longitudinal slits all over the plant. These little plants may be distinctly seen by means of a powerful microscope, in all stages of their development —from the numerous little round regular heads, seen beneath the transparent and unbroken epidermis, to the confused mass after they have broken through and scattered their fine powder over the whole surface. In favorable weather, and in good wheat fields, rust makes but little progress, and does little or no harm; but when the weather suddenly becomes hot and moist, its attacks are often fatal to the crop.

Fig. 10.—*Magnified View of Rust Plants, bursting open the Skin of the Straw—also Plants beneath Skin Unburst.*

Fig. 11. — *Magnified Wheat Straw marked with Rust.*

The growth of the grain is at once arrested, and if the crop is struck before the grain has formed, it will not be worth cutting. If partly formed it will be more or less injured. Wheat growing on low, wet and mucky soil is generally more liable to rust than on hard upland, but cases not unfrequently occur when it appears in belts or streaks, in the direction of prevailing winds, blighting alike every field of wheat, whether high or low, in its track. The remedy for rust is sowing on dry or well drained soil, which is rich enough to push the crop on and cause it to ripen early, beyond the reach of its attacks. Early ripening varieties are best on this account.

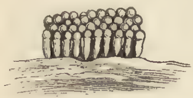


Fig. 12.—*Magnified Rust Plants attached to the Straw.*

Fig. 13.—*Highly Magnified Rust Plants.*

Insects.

The Midge—In the perfect insect state, is a small two-winged fly, somewhat resembling a musquito, about one-third its size, and of a bright yellow color. Early in summer it lays its eggs between the chaff of the newly formed

heads of wheat. The eggs hatch and produce small bright orange yellow worms or larvæ, which, when fully grown, in three or four weeks, are scarcely the tenth of an inch long. These minute insects, by their ravages have occasioned in the whole country a loss of hundreds of millions—more than the combined cost of the Union Pacific and Central Pacific Railroads. The destruction is usually the greatest in moist seasons, as the flies only lay their eggs in a moist air, and cannot endure a dry one; hence they are found at work chiefly in the night and on cloudy days. When the worms get their growth, they crawl down the straw when it is wet with rains, and form minute cocoons just beneath the surface, from which they emerge the next season in the fly state for reproduction. Many of the worms have not left the heads when the wheat is drawn in, and the straw continuing dry, they remain until threshed out with the grain, from which they are separated in the fanning mill, and in this state are well known to farmers, sometimes whole bushels being thus obtained in the screenings. They should either be burned or fed under shelter to pigs or poultry; if thrown out, they will produce new swarms of flies.

Fig. 14—*Magnified Portion of Wheat Head, infested by the Magnified Midge depositing Eggs.*

The best remedies for the ravages of the midge are the selection of such varieties of the wheat as are least affected by it—for example, the Mediterranean—and such good culture and management generally, as will bring early and heavy crops. A badly drained field, unmanured and imperfectly cultivated, has in some cases been nearly or entirely destroyed by the midge; while another field alongside, well managed in every respect, has nearly escaped and yielded a heavy crop. If the lesson which this insect teaches—namely, that the best cultivation only is attended with success—could be learned and adopted by every farmer, it would prove a real blessing instead of a disaster.

Hessian Fly.—This insect (*Cecidomyia destructor*,) as well as the midge (*Cecidomyia Tritici*,) was imported from Europe, where both have proved more or less injurious to wheat. The perfect insect considerably resembles a common musquito, but is a little smaller. It appears early in autumn, lays its minute reddish eggs on the upper sides of the leaves, where they hatch, and the minute worms crawl down the sheaves until they reach the bottom of the pocket formed by the union of the sheath and straw. Here they suck the juices and injure its growth, often causing it to wither and die. In about six weeks, it changes color, much resembling at this time a small flax seed. The following spring it passes to the pupa state, and afterwards to the perfect fly, making its second or spring attack on the crop. The injuries of this insect are shown by the broken and half prostrate straws scattered through the wheat field before harvest.

The Hessian fly has been eluded by sowing the grain so late as to be beyond the reach of the autumn insects—although this lateness has proved detrimental by inducing liability to winter-killing and rust.

The best remedy, generally speaking, like that for the midge, is the production of strong, heavy, early crops by good general management. It is said that this fly proved a positive blessing many years ago on Long Island, by actually compelling a better system of farming in place of the superficial and slipshod practices which had too commonly prevailed, and which resulted in the utter failure of wheat when the fly made its appearance.

THE CHINCH BUG is a small insect, about the third of an inch long, with a dark brown or black body and white wings, belonging to the bedbug order and odor, and often proving very destructive to wheat crops at the South and West—more particularly to spring wheat. Unlike the midge, they are most abundant and destructive in dry seasons, and are repelled or destroyed by wet.

THE JOINT WORM much resembles the Hessian fly in its mode of attack, but differs by occupying the substance of the sheath, straw or joint, producing hardened vegetable tumors—instead of merely resting between the sheath and straw, like the Hessian fly. In some of the Southern States it has proved more destructive to this crop than any other insect. As it remains in the straw through autumn and winter, it may be destroyed and its ravages lessened by burning the straw.

THE GRAIN WEEVIL or GRANARY WEEVIL, (*Calandra granaria*,) deposits its egg by boring a small hole into the grain, where it hatches, and the larva eats out the interior, leaving only the bran or shell. Kiln drying the grain is recommended.

There are several other insects that occasionally prove destructive to wheat, but the preceding are the most formidable.

COST AND PROFIT OF RAISING WHEAT.

In those districts which have proved well adapted to wheat raising, it has been found one of the most money making crops—more so before the appearance of the midge than afterwards. George Geddes, in his Agricultural Survey of Onondaga County, estimated the following as the cost of an average crop on a good farm, or 20 bushels per acre, (although 40 bush. are sometimes raised,) with the net profit before the present high prices :

Plowing once,		$1.50
Harrowing and Rolling,		.50
Drilling,		.31
Seed, two bushels,		2.50
Harvesting,		2.00
Threshing,		2.50
		$9.31
Twenty bushels at $1.25,	$25.00	
Straw,	2.00	
		27.00
		$17.69

At present prices this net profit would be much greater.

The wheat crop is more liable to uncertainties than corn and oats when all are accompanied with good management; yet with these uncertainties the best farmers obtain as an average at least twenty-five dollars net profit yearly in payment for interest on land, taxes and for superintendence.

John Johnston of Geneva, who has done much for the successful culture of this crop, and has obtained thirty-five bushels per acre on a field of twenty acres, when other fields were badly injured by the Hessian fly, midge and rust, gives the following as the leading requisites of success: "First, a well drained and thoroughly manured and prepared soil—the manure to be applied upon the furrow slice and worked in by the cultivator, harrow or other suitable implement; clean seed and early sowing." For the purpose of preparing and enriching the soil, nothing can be more generally beneficial than turning in crops of clover, as already described in the early part of this article.

Before concluding it may be well to invite attention to the importance of experiments in the horse cultivation of drilled wheat. The land must, of course, be entirely free from obstructions, and care taken to drill the rows evenly. An implement similar to Garrett's Horse Hoe, which takes ten rows at a time, would enable the operator to do the work expeditiously. The advantages would be—a probable increase in the crop, the eradication of weeds, and the introduction of wheat as a hoed crop in rotation. It would, of course, preclude seeding down to clover until a succeeding year.

MANAGEMENT OF HEDGES.

THE TRAVELLER through all parts of the country, and especially in the Western States, is struck with the general bad management of Osage Orange Hedges, with now and then some admirable exceptions. The failures are always owing to one or more of the following causes—frequently to all of them combined:

Fig. 1.—*Hedge Planted without Assorting, and before Cutting Back.*

Fig. 2.—*Hedges a "Humbug."*

1. Bad preparation of the soil, which is soddy or cloddy, or otherwise badly pulverized.

2. Bad selection of plants, — intermixing large and small, half-dead and vigorous (fig. 1) — resulting in inequalities and gaps, as illustrated in the accompanying sketch, (fig. 2.)

3. Want of the constant cultivation of a broad strip of mellow soil, at least four or five feet wide on each side of the hedge row, for the first three or four years at least, without which the growth will be slow and feeble, when it should be strong and vigorous.

4. Absence of thorough underdraining along the line of the hedge, without which the plants are lifted out by frost when young, or killed by severe winters when older.

5. Neglect of properly cutting back the hedge while forming, to give it a thick or dense bottom.

6. Want of good pruning, which may be entire neglect, or a broad, flat top and thin bottom.

A few additional remarks will be proper on some of these points. If the soil is well prepared, the young trees may be planted not only three times as fast as if badly pulverized, but they will be more certain to grow uniformly, and form a good and early hedge. Selecting and assorting plants is of great importance in preserving an even, uninterrupted and uniform barrier. The plants, before setting out, should be carefully assorted into two or three sizes, and all which are not plump, healthy and with good roots and well-formed buds, should be laid aside and tried another season in the seed bed. Let all the large ones be set in the row together, and the same care observed with the medium and the small ones (fig.3.)

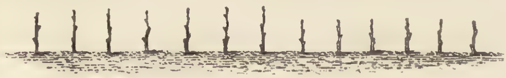


Fig. 3.—*Hedge of Assorted Plants not yet Cut Back.*

Those which are quite small should be kept in the seed bed for another year, especially if the roots are imperfect. We need scarcely add anything on the importance of cultivation to those who know that young trees as well as a row of corn, cannot flourish or make any growth without the soil is well cultivated. The difficulty with too many is that they cultivate a strip much too narrow or only two or three feet entire width, when it ought to be not less than eight or ten feet wide. Young trees send off roots on each side about as far as the height of the tree, and a young hedge, the shoots of which grow four or five feet high, will therefore have an extent of roots from tip to tip of not less than 8 or 10 feet, the whole surface above which should be kept clean and mellow, (figs. 4


Fig. 4.—*End View of Young Hedge well Cultivated.*

and 5.) If the soil is rich, the cultivation may be suspended after midsummer to allow the new wood to ripen. Planting the hedge row within a few feet of a good tile drain is an excellent practice, unless the subsoil has so good a natural drainage that water will not stand twenty-four hours in a post-hole on the wettest day in spring. This thorough drainage not only prevents the young plants from being thrown out by frost, but contributes greatly to the hardiness of the trees in subsequent years. We have known hedges to endure the severest winters when placed over or near a tile drain, while others similarly situated, but without drainage, were killed down to the ground. There is nothing that is more difficult than to induce novices to cut back the plants sufficiently. When set out they should be headed down within an inch or two of the ground, which will make the new shoots spring up vigorously, while without it, the growth will be comparatively feeble. When the plants are fairly started, they should be left to grow about two years undisturbed—in the rich soils of the West one year may do—so that they may become strong and obtain a good foothold in the soil. The process of heading down should then commence, and be continued twice a year until the hedge is formed, which will be in two or three years more. The first cutting back should be within three inches of the ground; the next, three or four inches above that; the next, four or five inches higher, and so on, increasing gradually for each successive cutting. This cutting back is commonly neglected, and the plants run up in a slender and meagre form, thin at the bottom, and heavy at the top. In order to keep the hedge thick below, the common error should also be avoided

Fig. 5.—*Young Hedge in Grass and Uncultivated.*

Fig. 6.—*Badly Trimmed Hedge.*

Fig. 7.—"*Hedge a Success.*"

of shearing broad and flat at the top, as shown in fig. 6, which leaves the bottom meagre and open. It should also be shaped to a sharp edge or peak, like fig. 7, which represents a perfect and successful hedge.

It happens fortunately that hedge rows which have been thus neglected may still, by proper management, be made into good barriers. Twelve years ago we had an osage hedge set out on a tenant farm too far off for proper superintendence. A tile drain was placed within a few feet, but

the occupant could not be induced to cut the trees back sufficiently. He thought it looked like "ruin" to cut down young trees which had grown five or six feet high, to within as many inches of the ground; and although in a few years it formed a good fence against cattle, it had numerous gaps below, and would not exclude small animals. (Fig. 8.) A year ago it had grown about ten feet high, when we directed it to be laid. This was done by one person taking a sharp axe and cutting the stems—which were now about an inch and a half in diameter—one-half off, as near to the ground as practicable. When this was done, another person with a pitchfork bent the trees over in an inclined and nearly prostrate position, in an accurate line along the hedge row. (Fig. 9.) If the branches of any of the trees were too broad, they were clipped or cut off with the axe. When this operation was completed, a new hedge had been formed consisting of the inclined trees, which should form an angle of about thirty degrees with the horizon. If the trees are quite bushy or spreading, it will be best to give the axe a long handle, so that the operator may do the work without fear of being scratched by the thorns; and the trees may be bent over more readily and accurately if two men with their pitchforks stand on opposite sides of the hedge. In the course of the season new shoots will spring up from the stubs and stems, and grow several feet high, and thus interlacing the old stems and branches, will form a new hedge (fig. 10) of such strength that the most furious bull cannot enter it.

Fig. 8.—*Hedge allowed to Grow without Cutting Back, as seen in Winter.*

Fig. 9.—*The same "Laid," or Prostrated by Cutting the Stem half off near the Ground.*

It is important that the cutting back be done quite early in spring, and before the buds have begun to expand. If left until later, or after growth has commenced, or when the buds are opening, a serious check will be

given to the trees, and they will make but few and feeble shoots. The course just described is well adapted to a farm hedge, and has the

Fig. 10.—*The same after One Year's New Growth.*

advantage that it continues to be a good barrier even immediately after the cutting down has been performed. Another mode of renewing an old hedge is to cut the trees down within a few inches of the ground, and thus allow an entirely new growth to spring up; a year or two being thus required for the new hedge to form, it is not so well adapted to general purposes, but is well suited to door-yard boundaries, as a neater growth may be thus obtained by the removal of all the old brush. If the cutting down is done early in spring, this second growth will be strong and rapid, and the new hedge may be made in less time than by setting out young plants.

CULTURE OF THE POTATO.

THE POTATO, the most important vegetable introduced in modern times, is worthy of more attention in relation to its best management than it generally receives. In furnishing a few directions, it is proper to remark that there is no crop respecting which there is a greater diversity of opinion on several points of culture. Whatever we may say, therefore, will meet with greater or less objection, especially from those who have made single experiments in relation to disputed points, and have fully made up their minds, without further trials under the varying circumstances of differing soils and seasons. We shall endeavor to give such views in relation to the matter, as have been well established by repeated practice under our own observation, or which will probably receive the assent of good cultivators.

The first important requisite is to reduce the soil to a proper condition. Potatoes are sometimes planted on sod recently inverted. In a few instances they succeed well; but they are more likely to suffer from drouth, except in wet seasons, and the practice is not therefore to be generally recommended. It is better to plow the previous autumn, and to reduce the soil to a high degree of pulverization. The additional plowing and harrowing required for this purpose will be repaid several times by the ease, rapidity and perfection with which the planting and subsequent cul-

tivation may be performed. If the seeds of weeds can be well worked out previously, it will save much labor in hoeing, and give a better crop.

The depth of the soil is another important requisite. The roots are less affected by drouth on the one hand, and continued rains on the other, when there is a deep bed of mellow soil for absorbing surplus water when it comes, and for retaining it through dry periods. Every one is aware that a dry season will often reduce the yield of potatoes, under ordinary management, to one-half the usual amount, or even one-fourth, when the summer proves to be an uncommonly dry one. A striking instance was observed on the grounds of a neighbor who had recently made an underdrain through the centre of a small field occupied in such a season with potatoes. The row which stood over the ditch, where the soil had been made deep and loose, yielded at least double the amount of any other row. Unless, therefore, the soil is already deep and loose, it should be turned over to as great a depth as can be done with a three-horse plow ; and if, in addition to this, a subsoiler can be used, all the better. Such treatment, more than anything else, will place the crop above any contingency of wet or dry seasons. As fresh manure is not the thing for potatoes, deep cultivation alone will be found greatly superior to any manuring in connection with shallow plowing. If the soil is too poor, it is better that the manure be applied to a previous crop—or what amounts to nearly the same thing, that it be evenly spread on the land the previous autumn, allowed to soak in by the washing of rain, and thoroughly pulverized with the harrow the following spring before plowing. Manuring in the hill should never be practiced when there is any fear of rotting, unless with old pulverized manure or fine compost ; and even then it is better if diffused broadcast through the soil, as the small fibrous roots of the plant soon extend several feet in every direction.

A great diversity of opinion exists on the subject of planting whole, cutting in large pieces, and cutting to single eyes, as well as in relation to the depth and distance for planting. All admit that planting potatoes whole, produces a greater number of stalks and more and smaller potatoes. The only advantage of employing whole potatoes is that they do not dry up so soon when planted late or in very dry earth. It will rarely happen that good, well pulverized soil will be found so dry as to require whole seed. Planting in hills both ways may do for weedy land, as more of the work may be done by horse cultivation than when in drills or in rows but in one direction. The last named mode, however, will generally yield nearly double, as more of the soil is occupied with the tubers. The practice of cutting to three or four eyes, or to a single eye, must depend on circumstances. For ordinary management, or where the finest culture and best care cannot be given, pieces with three or four eyes may be planted, twelve to twenty inches apart in the row. This is the mode now most generally adopted by the better class of cultivators. But if the soil is in the finest condition, a larger crop, with more uniformly large potatoes, may be obtained by adopting the single-eye mode. For this purpose the tubers should be of fair size.

and be cut some days before planting, so as to form a thin, dry crust on the cut surface before depositing in the ground. Some cultivators regard it as important to roll the pieces in slaked lime or plaster, while others entirely disregard it. We are unable to say what degree of value the practice possesses. The distance should not exceed eight or ten inches in the row, but may vary with the character of the variety for spreading at the top and at the roots—some varieties forming more compact masses of tubers than others.

There is another point upon which opinions differ—namely, the influence of the size of the seed. It is commonly believed that small potatoes reproduce small ones, and that the crop is lighter than from large potatoes. This opinion is partly correct and partly erroneous. When small potatoes are planted, culls are commonly used to fill out vacancies and spare pieces of ground, which receive less care than the better and earlier planted portions of the field. Again, small potatoes are oftener planted whole, yielding numerous stems and tubers at the expense of quantity. Hence the common opinion that small potatoes reproduce small ones. The truth is, that the tubers are strictly underground swollen stems, the eyes being the buds; and large ones tend no more to reproduce large ones than large sticks used for grafting will ultimately make the largest trees, or than small trees set from a nursery will never spread out and form such bearers as large nursery trees. When the large and small potatoes are cut alike, with the same number of eyes, and planted in fine mellow earth, at a proper depth, where the moisture is sufficient to impart vigor to both without drying, the difference in the size of the potatoes yielded will be scarcely perceptible. This experiment we have repeatedly performed, and it accords with many reported results, where the above mentioned precautions are taken. There is generally, however, a difference in favor of the larger seed, ascertained by careful measuring, and resulting doubtless from the greater vigor at the outset given to the young plants by the larger quantity of nutriment in the pieces. This difference, small as it is, and generally imperceptible to the eye, is, however, sufficient to amount to several, and sometimes many bushels per acre—sufficient to warrant the selection of good medium-sized potatoes for seed. Two inches or two and a half inches in diameter is a suitable size. If much larger, they are little or no better, although requiring a large additional amount of seed per acre. For example—a potato three inches in diameter contains more than three times the bulk of one two inches in diameter, and twenty-seven times the bulk of one an inch in diameter. A large potato, measuring four inches, will be sixty-four times the bulk of one measuring but an inch, and consequently sixty-four bushels of the larger potatoes would be required to afford as many eyes or stems as would be found in a single bushel of inch potatoes.

The tuber resembles the graft or shoot in another respect. The eyes at or near what is termed the root end, are smaller and more dormant than those at the eye end, in precisely the same way that the lower buds of a shoot on a tree are smaller, and are more tardy in breaking, than the upper

buds, while the terminal bud, like the terminal buds of the potato, is larger, and breaks sooner or more freely than any other. It is for this reason that those who raise potatoes for early market cut off the eye ends and keep them in a separate basket for early planting—reserving the rest for the main crop, and rejecting the root end altogether.

As already remarked, it is important for successful and rapid planting that the soil be uniformly mellow, with a smooth surface. It may then be evenly furrowed and fitted for easy covering. A common one-horse plow is usually employed for making the furrows, but is objectionable from the fact of its throwing the earth out on one side, and leaving a flat bottom. A shovel plow, or any implement operating like one, is better because it throws the earth evenly on both sides, leaves a quantity of mellow earth in the furrow, and forms a sharp, narrow trough at the bottom, causing the plants to stand in a perfectly straight row if the furrowing has been skillfully done. The person who drops may fix the exact place of every set with his foot as he passes, by pressing it into the mellow earth. It is said to be better to place the skin side down and the cut side up, because this enables the roots to descend better, but we have not tested this point by trial. Different modes are adopted for covering the rows. If the furrows are deep enough, and the sets have been pressed into the soil, the covering is sometimes effected by using an inverted harrow drawn by one horse, passing between the rows and covering two rows at once. Any harrow with very short teeth will answer. A slower, but more perfect way, is to use a cultivator, furnished with mould-board teeth, taking out the central one at the place of the row, and setting the others so as to throw the earth upon the furrow. Still another way is to cover with a light plow, but unless the work is very carefully done, the seed will be buried two or three times deeper at some places than others, and the rows will be uneven. On a small scale it will be obviously best to cover by hand. When many acres are to be planted, it would prove a matter of economy to procure one of True's potato-planting machines (fig. 3.)

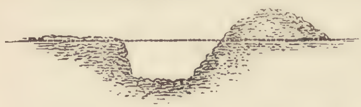


Fig. 1.—*Furrow made by Common Plow.*


Fig. 2.—*Furrow made by Shovel Plow.*

This machine cuts the potatoes, makes the furrow, drops the pieces at even distances, and covers them at a uniform depth—all at one operation. A single horse is attached to the machine, and any person accustomed to driving a horse in straight lines, can do the work; if the ground is in good order he will plant five or six acres in a day. An easier and more perfect mode is, first to mark the land with a corn marker, and then place a boy on the horse with the direction to keep him on the line. The man who has charge can then give his whole attention to the work directly before him. If the ground happens to be rough, or dry from lateness of season,

it is better first to furrow the land with a plow; this will effect deeper planting. The accompanying figure (fig. 4) represents a section of the soil after the planting has been performed—the earth being scooped out on each side, to form the ridge over the potato. The next figure (fig. 5) shows the same after the row has been ridged with the cultivator.

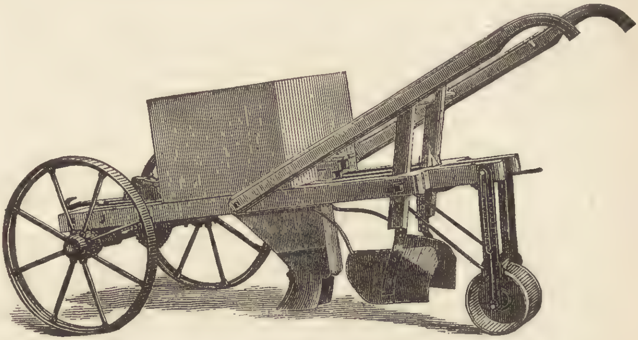


Fig. 3.—*True's Potato Planter.*

Fig. 4.—*Section of Work Performed by True's Potato Planter—a, Potato.*

There is one important requisite for success which sometimes being unobserved, the machine is pronounced a failure. Care must be taken that no potato large enough to choke the orifices is thrown into the hopper. These orifices, which are at the place of the cutting blades, may be readily expanded or contracted, so as to fit the size of the potatoes, and to prevent more than one passing at a time. The potatoes must be assorted beforehand, which may be done on some previous rainy day, with one tenth of the labor of cutting by hand. If only the larger potatoes are planted, they may be assorted into two sizes; if all are planted three sizes should be chosen. The orifice should be somewhat larger than the potatoes, and, if there are any long tubers, cut them in two.

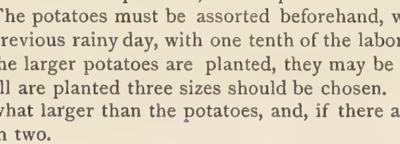


Fig. 5.—*The same after Ridging with Cultivator.*

The depth of the covering is obviously a matter of considerable importance. If too deep, the shoots will be long in reaching the surface and the general growth will be retarded; if too shallow, there will be danger of injury from drouth. Generally, potatoes do best when planted as early as good pulverization will admit, at which time the earth is commonly

moist enough to allow a depth of covering of not more than two or two and a half inches. How far a deeper or shallower covering would affect the amount of the crop, under varying circumstances and seasons, would be worthy a series of experiments.

A great point is to avoid, as much as possible, the labor of hand-hoeing. Much may be done by previous clean cultivation. The next thing is to harrow the whole surface with a short-toothed harrow, (or with the teeth of a common harrow driven back,) just before the plants come up. Generally about this time the weeds in the soil will be making their appearance. A good harrowing when they are only half an inch high, will be incomparably better and more effective than after they have grown some inches. This practice obviates the necessity of early hoeing, as it kills the weeds in the row. Some cultivators harrow again when the plants are two or three inches high; for although a few are injured or broken, they soon recover, and the saving of hand labor is of greater consequence. If done with an old harrow, the teeth of which have become rounded and worn so as to point backwards, there will be less danger of cutting the plants—this second growth of weeds being so small as to be easily destroyed, while the potato plants are scarcely injured. It is important that these operations be done exactly at the right time, as a few days would alter the whole aspect. The subsequent cultivation may be performed by suitable horse cultivators for throwing the earth towards the rows and rounding the surface slightly. Two-horse double cultivators should be used in large fields.

Any one may become thoroughly satisfied of the great superiority of the routine just described—namely, clean soil, deep cultivation, mellow and smooth surface, and hoeing by harrowing—over the more common practice of plowing shallow, forming a hard or cloddy surface, planting wholly by hand, and imperfectly at that, forming crooked rows which cannot be cultivated closely to the plants, and hoeing by hand when the weeds are a foot high—by observing the results side by side, and comparing the heavy cost and meagre crop of the last described mode, with the cheaper process and heavier product of the former.

Digging potatoes should be done early, or as soon as the dying of the tops, or their destruction by frost, shows that growth is at an end. If deferred, the late autumn rains may render the soil muddy, making the work more laborious.

The cessation of growth in the tubers may be determined by rubbing the skin with the thumb. It peels freely while they are growing rapidly; but adheres firmly when growth has ceased. If from frost killing or other cause it becomes necessary to dig them before ripe, they should be carefully handled and placed in shallow temporary pits, or on a barn floor. In the course of a few weeks the skin will adhere more firmly to the potatoes and they may be handled safely. Cellars are usually too warm for them during the early half of autumn, and it is better to allow them to remain out, covered with straw until the approach of cold weather, and if

properly protected from rain, they will become quite dry and may be thoroughly cleaned for winter storage.

The old mode of digging by hand is only to be adopted for small patches. Dr. Hexamer's six-pronged hoe is however an excellent implement for this purpose. A number of digging machines have been patented and manufactured within a few years. All of them, so fai as we know, have operated well, and proved labor savers, but more time will be required to determine which is best for general use. As they usually work by sifting the soil from the roots, they succeed best on a sandy or other light friable soil, and less perfectly on one that is tenacious or clayey.

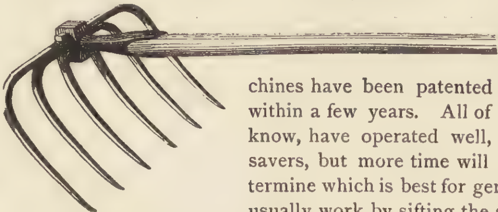


Fig. 6.—*Hexamer's six-Pronged Hoe.*

In the absence of any digging machine, we have found a good mode, on adhesive soils, to consist in throwing out the potatoes with a common plow, run carefully at a proper depth, and when these are picked up the remainder are thrown out by first harrowing lengthwise with the furrows, and afterward cross-harrowing. In this way two men will harvest in a day three times as much as by hand digging.

One of the best preventives of rotting, consists in having the potatoes perfectly clean before stowing away for winter. Hence the importance of selecting dry weather, when the soil has not been soaked by rains. But if mud cannot be avoided, care should be taken to remove it. They may be drawn in and spread on a barn floor, and in a few days they will be dry enough for storing away. We have found the revolving box, represented in the annexed figure, to answer an excellent purpose—the earth dropping out through the slits between the boards. One of these boards being hinged and buttoned, admits the potatoes. The motion should be moderate, to prevent bruising. A more perfect way is to provide a longer revolving trough placed in a stream, where it will rapidly wash the tubers in a thorough manner.

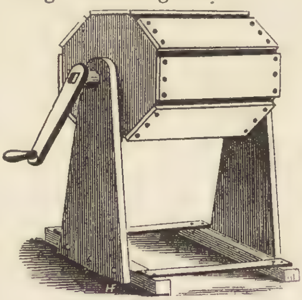


Fig. 7.—*Revolving Box.*

Different modes are adopted for keeping potatoes through winter. A good way is to place them in large boxes, covered from the light, in a cool dry cellar. Tree boxes, or such as are used by nurserymen for packing their orders, are a convenient size and answer a good purpose. These tree boxes are often cast aside as useless when received, or else split up into kindling wood. The bottom should have slats or openings between the boards. They should be placed on

blocks a few inches from the ground or floor, so as to admit ventilation, —an important preventive of the rot. Potatoes may be buried out of doors, and will keep well if the work is properly done. Three requisites are necessary—ventilation, freedom from water, and protection from freezing. Large quantities of potatoes are spoiled every year, by not attending to these particulars. Ventilation is effected by making a hole at the top and filling it with a large even wisp of straight straw. Farmers have often observed that their potatoes were rotten at the top of the heap, and have erroneously supposed that it came from freezing, when, in fact, it resulted from the foul air which had no escape. The best way is to use a large quantity of straw with a thin stratum of earth, instead of the more common practice of using but little straw and much earth. We have found the practice of placing sixty or seventy bushels in a heap, covering with a foot of packed straw and three inches of earth, has been uniformly successful, not one per cent. generally being lost by keeping through winter. The accompanying cut gives a section of such a heap, and shows the manner in which the work is performed. The heap when finished should have the outside earth beaten hard and smooth with a spade, so as to throw off the water of rains.

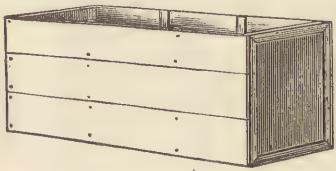


Fig. 8.—*Box for Storing Potatoes.*

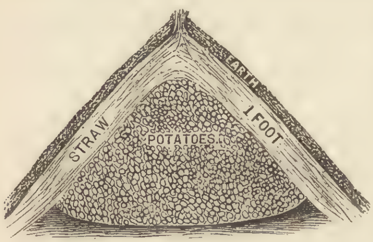


Fig. 9.—*Section of Potato Heap.*

Many varieties of the potato have been raised and cultivated, and diversity of opinion exists in relation to their value. This is partly in consequence of a want of full trial, and partly from the fact that many of them succeed well on some soils and imperfectly on others. We notice briefly a few of the leading sorts. Among the older varieties, the *Long Pinkeye* was one of the best—white, with purple eyes, very white flesh, and fine and delicate in quality. The tubers spread much in the hill, it did not yield well, and the sort has now nearly passed from cultivation. The *Round Pinkeye* was larger, with a yellow flesh, more productive, but poor in quality. The *Mercer*, with purple streaks through the flesh, has long been one of the best table sorts; but as it often rots badly, its culture has been discontinued, except on light and dry soils, where it still succeeds well. The *White Mercer* is a sub-variety without the dark streaks. The *Early June*, large, white, roundish and smooth, has long been a fine early potato, but is now superseded by more productive sorts. The *Buckeye*, a large, early

potato, with deep reddish eyes, is a fine early variety, but has the formidable objection of being frequently hollow. The *Dykeman* is a famous early variety, much cultivated in the vicinity of New-York city, but we have found it to yield small crops. The *Prince Albert* is a widely known, very productive and popular white potato, long and flat, often tapering and curved at the smaller end. It is commonly of good quality, particularly if kept till spring. We have found it of late years much more liable to rot, and yielding less than some of the newer sorts. The *Fluke* somewhat resembles the *Prince Albert*, and although occasionally excellent, is often only of second rate quality. The *Jackson White* is a good potato, but is not productive. The *Orono* considerably resembles it and yields much better crops. The *Carter*, although considerably affected with the rot, is still cultivated to some extent, and is not on the whole excelled in quality. But all these sorts are becoming more or less superseded by the best of the *Goodrich Seedlings*. Some of them introduced several years ago, although very productive, have not proved of the highest quality. The *Cuzco*, for example, has yielded on the grounds of the writer at the rate of five hundred and twenty bushels per acre, and there was but one objection to this sort—namely, that the potatoes were not good for anything. The quality, however, is not uniform, and in some localities, or in certain seasons, they have proved tolerably good. The *Garnet Chili* has been widely introduced, and is a good hardy sort of medium quality. The later sorts, however, are much the best of the Goodrich varieties. Perhaps no potato ever raised has proved a greater acquisition than the *Early Goodrich*, (fig. 10.) Taken altogether, we know of no early potato that will approach it for general value. It is quite early, yields largely, has scarcely

Fig. 10.—*Early Goodrich—Reduced one-half in Diameter.*

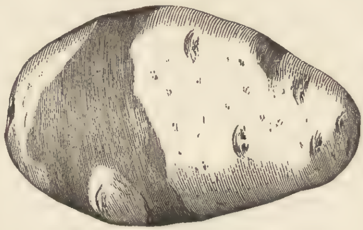


Fig. 11.—*Calico—Reduced one-half in Diameter.*

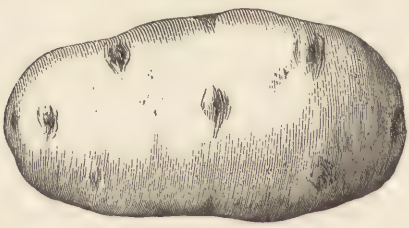


Fig. 12.—*Harison—Reduced one-half in Diameter.*

ever been affected with the rot, is excellent in quality, and is a good keeper. The *Gleason* and *Calico* (fig. 11) are later sorts, and about equally productive and excellent. If they succeed as well in all localities as where already tested, they will, at least for a time, become the principal or standard late varieties. The *Harison* (fig. 12) has been less tried—it is very productive, has yielded four hundred bushels per acre, but in some places its quality has hardly come up to first rate.

IMPROVED SINK.

By L. D. Snook, Yates County, New-York.

MANY A HOUSEWIFE has washed her dishes for years on a table. The consequence is each time the table is soaked with grease and water, dripping on the floor and soiling dress and apron. Husband, if you have no sink, and if you desire to please your better-half, and save buying a few more yards of calico each year, also to improve the appearance of your kitchen, then proceed to make, or have made, that necessary article, a sink. The one illustrated below is cheap and quite simple in construction. The sink A is 4 feet long, 2 feet 8 inches wide, and 7 inches high, made from inch oak wood, close jointed to prevent leaking. The small frame shown in the background is denominated the *dish rack.*

Fig. 1.

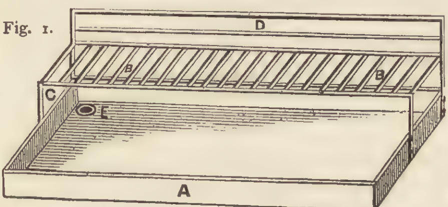
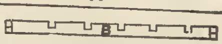


Fig. 2.



Improved Sink.

Dishes will be washed in a pan on the bottom of the sink, and placed in an upright position on the grate B, and resting against the cross slats D. Knives, spoons and all articles of this class are laid on the grate B. Standards C C are 1 by 2 inches; short ones 6 and long ones 14 inches in length above the top of the sink. Long slats D are ½ by 1 inch. Those in which the slats B B are morticed are 1 by 1½ inches, hard wood. A section is shown in fig. 2. It is 8 inches long, 1 by 1 inch square, and notched as shown. For plates eight, and for saucers ten notches are made in each slat—for plates the slats are placed four, and for saucers three inches apart.

Placing dishes in a vertical position they soon drain off; consequently you can wipe more dishes, and those *cleaner*, without changing the towel. All refuse water passes through the discharge pipe E. Hang the washbowl upon a nail driven in the frame above E. The whole should be

painted and varnished before being used. It should be about the height of a common table, and underneath, a closet in which to keep kettles, dripping pans, bake tins, &c. Set the water pail on a bench at the side of the sink. Many more little conveniences could be added, but they will readily suggest themselves to the reader.

FARMERS' GARDENS.

THE COUNTRY IS FULL OF RURAL IMPROVEMENTS—but the improvement of farmers' gardens is not one of them. With a few honorable exceptions, they are the places, of all others on the premises, to find a mass of rank weeds. We have just driven past the garden of one of the best farmers in the country. The farm was a pattern of neatness—handsome board fences—not a weed to be seen along the division lines—fields perfectly clean and well cultivated—and luxuriant crops in every direction. The farm contains a little over a hundred improved acres, and the owner has cleared over two thousand dollars in a year from it. But how about his garden? It was hard to say whether weeds or vegetables had the ascendancy. The sweet corn at one end was rather taller than the fox-tail; the cabbages could be occasionally seen through openings in the pigweed plantations, and the early potatoes had been dug without interfering with the rank growth of other plants. In another garden a few rods distant there was an evident struggle between a refined taste on the part of the woman and utter neglect on the part of the man. One spot eight feet square, brilliant with Japan Pinks, Petunias, Asters, and others of the finest annuals, formed a perfect gem—a sort of oasis in the desert, if the term desert may be applied to a handsomely fenced quarter acre of rich land covered with a promiscuous growth of ragweed, mustard, thistles, fox-tail grass, &c. If there were potatoes, beets, parsnips and onions beneath this growth they could not be seen. There is no use in disguising the matter—there is a shameful neglect all over the country in this respect. If it were a mere matter of taste, we should not urge the point so strenuously; but while so many farmers place money-making and money-saving at the head of their list, they ought also to know that nothing contributes more to supply a table with luxuries at little cost than a good kitchen garden. This term includes the small fruits as well as vegetables. Strawberries and raspberries, gooseberries and currants should be seen on every table in early summer, and nothing would more promote the health of a family.

The trouble is that the garden is not made a main object—it takes the last chance. If the corn is to hoe, the garden must be neglected till it is finished.

The only way to effect a reform is to take hold of the thing in earnest,

and let the garden come first, and the corn, potatoes and wheat follow after. Let this matter be planned before-hand and made a part of the prominent business of the season. If a half acre is too much to attend to, take a smaller patch, and let it receive first rate attention. A good garden may save one, two or three hundred dollars in butchers' bills and doctors' bills. If rightly planned it will not cost half the labor to keep in order as a single field on the farm, and will be less trouble and expense than is usually required for fighting weeds all summer in farmers' gardens as commonly seen.

First let the ground be made right. If too wet, underdrain it as you would any other portion of the farm. Being small, this need not cost five dollars. It need not be trenched by hand at an expense of fifty dollars, but it may be plowed deeply—trench plowed and subsoiled—working in at the same time a good quantity of manure at a very moderate cost. If foul or weedy, summer fallow it one year by plowing occasionally and harrowing it once a week until rendered perfectly clean. Then, to economize labor, lay out the garden so that most of it may be cultivated through the season with a horse. The small vegetables, such as onions, lettuce, radishes, &c., which require "beds," may be placed in a strip along one side, but peas, beets, beans, early potatoes, sweet corn and cabbages, may be put in handsome drills, and worked with a modern fine cutting cultivator, which will do nine-tenths of the work. Do not leave this cultivating and dressing out to the latter part of the week, when unfinished jobs have accumulated and must be hurried through in order to clear the Sabbath; but let the garden have the precedence of everything else on every Monday morning, until every square foot is as mellow as an ash-heap, and as smooth as a floor, and not a weed is to be seen. Let this course be carried out faithfully and energetically, and the cost will not be so much as it now is with the majority of farm gardens. The products and profits will be immeasurably greater.

FRUIT ROOMS.

IT WAS FORMERLY a common practice to keep vegetables, pork barrels and fruit, all in the same apartment in the cellar. The fruit was sure to imbibe any bad odors, and its freshness and flavor were, of course, injured. If the cellar was too warm, the apples would decay rapidly—which would be accelerated by an excess of moisture. Good managers have adopted the practice of making a separate apartment for their fruit, where the air may be kept constantly pure and cool, and everything imparting a bad odor carefully excluded. If the cellar happens to be too damp, a coating of water lime on the sides and bottom will render it quite dry enough. There should always be at least one thermometer in a fruit

room and the temperature kept down as near freezing as may be practicable. Two thermometers, one for the upper and the other for the lower stratum of air would be preferable. The windows should be hung on hinges on opposite sides of the room, so as to admit necessary ventilation. For controlling the temperature, they should be made to fasten at different points, so as to let in little or much air at pleasure. Rolling blinds in connection with the windows are useful.

Apples may be kept headed up in barrels till near their period of full maturity. Baldwins and Greenings, for example, if carefully picked, may remain in headed barrels in such a cool cellar until about spring; and Northern Spies and Russets several weeks later. As soon as danger of decay is apprehended, the barrels should be opened and the fruit assorted. A more perfect mode is to bed the fruit in the barrels in baked sawdust or in perfectly dry, soft chaff, (the chaff of timothy is best,) which will absorb the moisture, preserve a cool and even temperature, and prevent decay. Apples thus packed and kept near the freezing point, will remain fresh a long time; and if an occasional cold snap should cool the cellar a few degrees below freezing, the chaff or sawdust will prevent them from becoming frosted.

Fruit required for consumption during winter, is most easily kept upon shelves. These shelves should be in the middle of the apartment, with a passage extending all around, both for easy access and for more uniform ventilation. The shelves may be about five feet wide, which will enable the attendant to reach the middle from either side without difficulty. If much wider than five feet, this cannot be done. An apartment which is nine feet high may have three successive shelves, one above the other, with a space of two and a half feet between each for ready access, the lowest one being within a foot from the floor. A board 5 inches high, extending around the edges of each shelf, will be sufficient. For keeping pears, these shelves should be furnished with lids or covers for the exclusion of light; or flat movable boxes will answer the same purpose. If provided with covers, and if made of the right size, they may be placed compactly upon the shelves side by side.

The size of the fruit cellar may vary with the amount of fruit to be kept. Fig. 1 represents an apartment of moderate dimensions. If the shelves are five feet wide, and a passage two feet and a half extends around them, the interior will be 10 feet wide, and the length may vary indefinitely. It is about twenty feet, as shown in the plan, and the three fruit shelves will be each five by fifteen feet, holding fifty or sixty bushels. This amount will be as much as most families will need for an abundant supply until spring, and the fruit will last longer if such as is

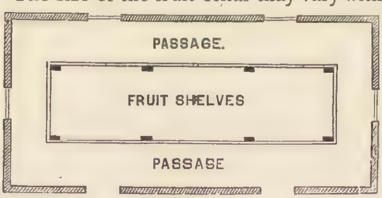


Fig. 1.

needed for pies and stewing are carefully picked over and separated on the first appearance of decay, by the owner or some reliable person. If left to hired girls, they will be sure to select the hardest and soundest, and leave the decaying ones, so that in a few weeks the whole will be a mass of decomposition. A larger and more perfect fruit department is represented by fig. 2, which is nearly twenty feet wide, and has two series of shelves, and one of drawers for pears. A place for storing barrels of fruit may be left by making the shelves two feet shorter at one end. It will be observed in both of these plans that windows are placed on opposite sides, so as to allow a free passage of air—either of which may be occupied as a door, according to circumstances. If these rooms constitute a part of a common house cellar, and the ventilation cannot be on every side, there will be no difficulty in selecting two opposite sides or ends for this purpose. The separation from the rest of the cellar should be effected by means of an eight inch brick wall.

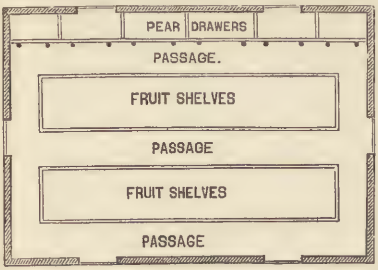


Fig. 2.

A cellar under a grain barn, where the temperature may be more perfectly controled, will generally be found best for keeping large quantities of fruit. The floor should be double, with a space of air or some non-conducting substance between. A single brick wall within common cellar walls, with an inch or two of interposed space of air will render the cellar more perfect.

Cellars are usually too warm in autumn at the time of fruit ripening for the best success. Winter fruit is therefore commonly kept in cool out-buildings until the approach of cold weather. But a more perfect way is to construct the fruit room entirely above ground—the walls being made double or lined, and the same care taken with the floor above. Into this apartment the fruit may be placed as soon as gathered, as it may be kept as cold or colder than any out-house by opening the windows on cool nights and closing them during warm days. The frost-proof walls will exclude cold in winter, and, if necessary, the heat of a small stove may be added. Artificial heat will, however, be scarcely ever ueeded, provided care is taken to keep the house closed during the coldest weather.

Preventing Rust.—Plows should be kept bright and ready for use in spring. These, as well as all cutting tools, may be preserved from rust by a very thin coating of grafting wax—which will be very convenient for all those who are in the practice of doing their own grafting. Those who have no grafting wax may take three parts of lard and one of rosin and melt them together. This will make an application more easily applied than the wax, and which will answer an excellent purpose.

RURAL IMPROVEMENTS.

Written for the ANNUAL REGISTER by ROBERT MORRIS COPELAND.

RURAL IMPROVEMENT is a simpler title than Landscape Gardening for the art of laying out grounds, so that they shall have as many agreeable and attractive features as is consistent with their size and character, and the means and tastes of the owner. The possibilities of beauty in a country place depend on all these conditions. It would seem at first as if whatever might be one's means and taste, he would be obliged to confine his undertakings to the character of the land he owns. But money is potent, and by its aid a naked rock, the most sterile sand, the hardest clay, or the worst bog, may be changed into a lawn or garden. But, on the other hand, while a lavish expenditure of money may be required to make one piece of land beautiful, the adjoining field may have such natural features that a small sum will develop a great amount of beauty. These facts point out the importance of wisely selecting the place one wishes to make into a home; the choice of location may be worth more than the final cost of laying out one's country place.

As the cost of rural improvement is always large, it is not strange that men should try to lay out their places for themselves, aided by the knowledge which they may get from books and newspapers, and so save whatever percentage of the cost would be the fee of a professional adviser.

I hope in this article to be able to add something to the general stock of ideas upon these subjects. To make my counsel understood, I must first refer to the value of professional advice to all who wish to get the best results from their land at the least cost, and in the quickest manner. A wise selection of the site of the future home is of such great importance that one should carefully consider all the pros and cons before a final decision is made, and here we particularly feel the value of experience. A man who devotes himself to laying out country homes, sees at a glance the capabilities of any piece of land, and if he properly appreciates his employer's condition and wants, can tell before a dollar is spent whether a purchaser should prefer one house lot to another. A short examination of different lots will generally show him which offers the most capacity and promise of beauty at the least constructive cost. As it will cost many hundreds or thousands of dollars to make even the simplest village home, can it be doubted that the improver would be wise to spend a reasonable percentage of his cost in deciding about the best location, which may save him hundreds of dollars in after expense?

When the improver has come into possession of the land on which he has decided to live, there must be a house, an avenue or path, some grass or lawn, some kitchen-garden, some fruit trees, some shade and ornamental trees and shrubs, some fence and some cultivation. All these "somes"

represent dollars which must be expended, whether well or ill, or else the land will be a barren purchase. If there is a difference between getting the most or the least, or a medium amount for the money necessary to be expended, and the wisest method can be learned by paying one who makes it his business to know what can be done for convenience and beauty, with earth, grass, trees and buildings, is it not poor economy to withhold the commission? Supposing when the purchaser is about to build, it seems to be a question of interest whether the house should be set ten or twenty feet north, south, east or west of any particular place, and that we must pay to obtain the opinion of a skillful and experienced person, how small such a fee is in comparison to the cost of rectifying a mistake after the work is done. I need not follow out this argument in its application to the detailed treatment of the country place—what is true of a part is equally so of all.

But the question may rise in the in the improver's mind, is there any one more competent than I am to give me these decisive opinions—how can I tell whether those who profess to teach have the capacity which they claim?

Most of those who offer themselves for such services come under the title of landscape gardener, landscape architect, &c., but the title proves nothing, and may serve only to cover pretentious ignorance. The term landscape gardener, is as indefinite as it can well be, for we combine a word, landscape, which has the broadest significance, with one, gardening, which is of very limited application—but without discussing the word, let us consider some of the qualifications which should be possessed by the individuals who assume the title and practice the art.

In selecting a physician or lawyer we are guided by their skill as shown in their acknowledged work; is it of less importance to weigh a man's capability who is to form the grounds where all our interests and pleasures are to centre. We should look at the tastes, habits and occupation of the proposed guide, for it may be reasonably assumed that no one is fit to create beauty and arrange grounds so as to increase their charms who is himself indifferent to the beautiful. Because a man can graft, plant trees, hoe, trundle a wheelbarrow, or raise fruit, is no proof of his fitness to design and lay out the general treatment of one's place, any more than the compounding of mortar and carrying the hod converts the laborer into an architect or master builder.

Besides loving and studying nature, and continually planning how to combine natural objects so as to produce harmonious and beautiful results, a rural improver should be sufficiently cultivated in mind and social qualities to understand what makes the refinement and elegancies of a home, and should be able to set before his employer a high standard of fitness and taste. He should appreciate the present and future possibilities of his client's social condition, and try to treat the surroundings of the home in such a manner as to act favorably on the family itself. Many of the men who profess to lay out grounds, and who have the merit of familiarity with

all the details of garden work, acquired their knowledge, as under or upper gardeners in large places in Europe or this country; and having seen what some wealthy people require, without understanding why, they assume that what is sauce for goose is sauce for gander, and carry out a settled formal and stereotyped method of laying out and decorating any places entrusted to them. To such men we owe the nauseating repetition of straight avenues, rows of trees, semi-circular drive ways, sinuous paths, terraces, rows of balsam firs, clumps of Norway spruces, maples, &c. They use, so often and abundantly, the best things in a meager and tasteless manner, that at last we revolt at what are called country places, and sigh for free and untrammelled nature. Good advice is worth twenty per cent on the cost of any proposed improvements, while bad or weak advice adds twenty per cent to the cost in actual loss of what might have been obtained from the money which has been expended. It may seem in a practical article almost supererogation to dwell at length on these facts, but I consider a full understanding of the motives which should influence the improver at the outset, of prime consequence, and that a misapprehension of the spirit in which improvements are to be undertaken, will be almost fatal to any good results. A correct understanding of these points is as important to the man who makes his own plans as to the professional man, whose place he supplies; both are to do the same thing, and should be governed by the same principles and motives. In laying down a few principles for treating grounds, I shall not expect to exhaust the subject; it is too large to be fully discussed in narrow limits, but rather to stimulate the reader to study carefully before he commits himself to any proposed method of treating his present or future home.

The greater number of country places are small; perhaps the majority do not exceed half an acre, and in so small a place it seems as if one could not make a mistake. It is very common to hear the owner of half an acre say—I agree with you that when a man is going to build a fine house, and have a large estate, it is very important that he should get good advice, and begin right; but my place is only half an acre, and it can't make much difference what I do to it. This is specious, and sounds reasonable, but is entirely wrong—the large place, by its size, covers many blunders and mistakes—we cannot see it all at once, and if one part is bad, some good feature will attract our attention elsewhere and redeem the blunders. Nature is ever kind and ready to assist us, and trees and shrubs, though badly planted and grouped, will in time get size and beauty of leaf and flower. If there is only breadth in the management of the estate, and large masses of trees, and a few lawns have been made where there can be variety and play of light and shade, in time we are sure of some beauty. The owner of extensive acres will probably be rich, and can afford to make mistakes and correct them. Not so the poor man, whose narrow limits are ever present, and whose scanty area must be always seen at once. We cannot hope to have breadth of lawn, with its light, and masses of trees with their shadows in half an acre—a few trees and well selected groups of shrubs

upon some little grass plot must give our variety and beauty. The poor man and the small place must make much of what there is—every blade of grass must be made to tell, and there must be no mistakes to require either increased expenditure for their remedy, or remain a blot ever present and annoying. As the man of large means and many acres will generally seek aid from professional persons, I shall; in the few plans I offer to illustrate this article, confine myself to small places, and give such advice and directions as will help those who live in village homes, rather than the owner of the country place. I might easily prepare a series of plans which would exactly express my ideas, and then what could be done where one could control all the condition of surface, size, expense, &c., but instead of that I shall give some plans actually made, where the problem was to take a certain number of lots already offered for sale, of small and nearly equal size, and produce the greatest amount of variety.

Many persons, as I have before said, think that all small places might as well be arranged in one way as another, and my object in treating these small lots was to show that sameness and repetition are by no means necessary. These nine lots of land lie on opposite sides of a street in one of our suburban towns; four of them are surrounded by streets—five front on a street and extend back to a low, boggy marsh, through which a feeble stream slowly meandered. From the street to the stream is a uniform slope, though broken into various undulations. The conditions of the plan required that arrangements should be made to give a house, barn, avenue, some lawn and some kitchen garden, to each place. As a matter of choice I should have left out the barns if I could, as it rarely happens that nine persons living in a suburban town, on adjacent lots of half an acre in size, will require a barn, but as the barn was demanded by my employer, I have provided for it.

I will first describe the five lots (fig. 1) bordering on the stream. Believing that there is nothing more beautiful in the country than well managed water, whether running like a brook, or detained in a pond, I determined to drain the upland and marsh into a brook, which, by changes of level in its bed, I could at some places open into small ponds, while at others the brook character should be especially retained. The first step was to arrange the water in lot No. 2. I made a pond which extended part way into No. 1, while it gave rise to the branches of a brook, which, passing into three, combined into one stream, and then swelled into a second pond. Leaving these, the water follows a narrow channel, because the land rises abruptly towards the street, and also declines more rapidly towards No. 5, giving the water a quick flow. In No. 4, although the inclination towards the north is less, the abrupt bank on the west did not permit the stream to be enlarged into a pond. This treatment of the marsh, converting it into water, made a great change in the desirability of these five lots of land. Before the improvement they were less valuable than those on the square, because a portion of their surface was unavailable, and no one person could have improved or drained his lot

EXPLANATION.

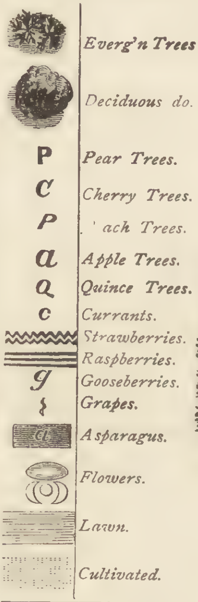


Fig. 1.

without the general consent; and as there is always likely to be some crooked person among men, who does not find his interest or inclination coincident with the rest, it would have been difficult to bring the low land into good condition. But by the substitution of water for marsh these lots became more desirable than those which had no water within their limits.

An examination of the treatment of the shores, and the planting proposed for the banks of the artificial water, will show that I tried to increase as much as I could their variety, and to give the water in each lot some chance peculiar to itself.

Fig. 2.

In No. 1, the path leading from the kitchen garden takes one through a grove of evergreens, where he would lose sight of the practical features of the garden, and come by a sudden turn and a slight descent to the banks of the brook; following the brook fringed with shrubs, as the path turns to reascend the slope, one would get a view across the pond of No. 2, and just see its outlet hidden among trees.

In No. 2 this treatment is practically reversed, the path for the house taking us directly by the shores of the pond, thence along its banks to a thick grove of mixed trees near its outlet, and then returning, passes through the kitchen garden to the house.

No. 3 gives an opportunity for dense planting, and on leaving the garden we should enter a wood, follow a woodland brook broken into several small falls, to the shore of the pond, which is heavily fringed and shaded with trees ; from this point we could return either through the kitchen garden or near the pond of No. 4, and north of the barn.

No. 4 resembles No. 1, with a difference in plantation, and a change in the arrangement of kitchen garden.

No. 5 is unlike all the others. The water having a mixed pond and brook character, the plantation is varied accordingly, and is thrown more into groups, so that the visitor would get a varied, because occasionally interrupted view.

Following the land back from the water we come to the kitchen gardens, which are laid out differently, though in all, the fruit trees and shrubs are valued for ornament as well as use—in some cases they are grouped ; in others they border the walk, both for shade and convenience.

In small places every object must be made useful as well as beautiful, and while we cannot claim for a pear, cherry, peach or apple, as much of form and beauty of color through the year as is the attribute of the elm, the maple, the hemlock, pine or spruce, they are not ugly trees. Their fruit compels us to treat them in a different way from purely ornamental ; they must be pruned and shaped, and kept regular and compact. But their blossoms are beautiful ; no tree equals the apple in floral beauty, and could we let the apple grow into the picturesque shape it takes in the hedge row, it might be commonly introduced as an ornamental tree. But unfortunately for picturesqueness, the apple tree best for fruit resembles a cabbage in shape, while the pear should be trained into a solid triangle ; the peach bears best when pinched and pruned into a globular form ; the cherry alone can be left to itself. But for flowers in the spring the kitchen or fruit garden may challenge the lawn and grove. Peaches, pears, cherries and apples give a succession of fragrance and color for several weeks. If, in planting a small kitchen garden, we set the trees in groups, they will exhibit what beauty they have to the best advantage, while they are equally well placed for cultivation and fruit.

In the kitchen garden fruit trees should generally border the walks, as in such position they are more easily managed without interfering with the crops which occupy the rest of the land, and their roots can fill the land under the walk. Between the trees we may set currants, gooseberries, or even raspberries. When it is desirable or necessary to mask an ugly building, fill the bend of a walk, or to give solidity to the apex of a triangle between the paths, fruit trees can be planted in regular groups. I use the word regular to show that they must stand at suitable distances from each other, in order to give the roots and branches of each individual tree sufficient room. On the other hand, a group of ornamental trees may be planted without regard to the perfect development of the specimen tree, as we look in such groups for particular effects of form and color, which are sometimes

best produced by bringing the trees close together, and at others by separating them widely.

Passing out of the kitchen garden, in the plans we are discussing, we come to the barns. The barns are joined whenever possible, to take up less room and make it more easy to conceal them, as the same plantation which covers one barn helps to screen the other.

The houses are supposed to be of different size and style of architecture, and are about the same general distance from the main road, but are placed on different sides of the lots, to show that there is no necessity, as is frequently supposed, of setting the house in the middle of one's grounds. As they stand they are parallel to the street, which in small places is generally desirable, as a house which stands at an angle to the street is apt to look awkwardly. The position of the house is of comparatively little consequence when the grounds are reasonably extensive, as good groups of trees and shrubs, and proper treatment of the avenues and paths, will withdraw the attention from the relation between the fixed lines of the house and the street, and it often happens that houses not parallel with the road become most effective when skillfully managed. The situation of the house and barn generally decides the position and number of avenues.

The main avenue to the front of the house is properly called the approach; it should not be less than fifteen feet wide, and should follow some easy curve. After it leaves the front door it may bend round upon itself, leaving a circle or oval of grass and shrubs as a guide to the horse and wheels, or it may return to the road. The latter treatment I particularly dislike, unless it be for a doctor's or a public house, where coming and going will naturally be in both directions, and where convenience is of more consequence than effect. Such a semi-circular avenue cuts off a piece of land which it converts into a kind of island of little value either as lawn, grass plot or shrubbery.

From the approach near where it turns upon itself, an avenue diverges to the barn and to the rear of the house; this road need not be more than twelve feet wide, and should follow the line of greatest convenience without especial regard to its own effect.

From the avenue and the approach, paths will lead one to the kitchen garden, lawn, &c. Paths are mere conveniences, and should never be made unless they are really wanted. A lawn cut by a path which can be seen, is reduced in size and grandeur, but trees and shrubs and flower beds decorate the lawn, and may be considered essentially a part of it. A path is a harsh line, which divides, without adding anything to the beauty of the lawn, and convenience alone excuses it.

It will be observed in these plans that I have carried these paths only where the management of the place compels men to go to do their work, and to visit the places they would naturally wish to see; it may seem that I may have had less in some of the kitchen gardens, as in No. 4 and 5, but I think a study of the plan will show that ease of access to all parts of the garden is increased by the cross paths, which at first seem superfluous.

The situation of the flower garden will be governed largely by the tastes of the proprietor. I have introduced about the same amount into each place, but, as will be seen, the flowers are to be cultivated in beds in the grass, which can be omitted at will, and the grass occupy their places, without injury to the general plan. I think every country place requires a good many flowers, and to sacrifice them in order to increase the land which can be devoted to cultivation, or to save expense, is poor and blind economy. We should show, by our culture and love of flowers and ornamental shrubs and trees, that we recognize that there is a value in beauty which cannot be measured by money. Fruit and vegetables we can buy if we never grow any, and if we devote all the area of our country home to beauty, it will prove a wise investment. We may carry a supply of food for a week in a basket, but nothing can be brought or carried which will replace the effect of well grouped trees and shrubs, or a richly colored flower bed in our lawn or by the side of an approach. I should be sorry to say anything to discourage any man from cultivating fruit and vegetables, but if either the useful or the beautiful must be sacrificed in the country place, I would let the useful go as the least valuable and easiest replaced. But I think I have shown in these plans that there is room for both.

I have thus far described the first five lots, (fig. 1,) which are of nearly the same size, containing about 27,000 square feet. Nos. 6 and 7, (fig. 2,) which contain about 18,000 square feet, though smaller, are treated in the same general manner, although, of course, there is less room for variety. No. 8 occupies 52,000 square feet. With the increased size I have given a different arrangement, varying from the small lots rather in the size of the parts than in the introduction of new features. A path might be carried from the barn along the eastern boundary, to stop at a summer-house in the southeast corner of the lawn, or to continue along the southern boundary to the approach; in the latter case it should be well massed by plantation. I have not shown any such path, because I do not think it is necessary.

No. 9 is nearly two acres in extent. I have set the house near the northern part to increase the apparent size of the place. By massing the house, kitchen garden and stable together, we give a wide space for the lawn, which, with its plantation, becomes as it should be, the main feature of an ornamental country place.

Nothing is more beautiful than well combined or contrasted grass and trees, and a great deal should be sacrificed to secure all of that kind of beauty which is possible. Besides the absolute charm of the lawn, it is simple, and when once made, easily maintained; a well made and planted lawn will, at a trifling annual cost, increase in beauty every year; whereas, flower beds, flower gardens, and all the fugitive charms of nature are a constant or recurring expense.

To secure the large lawn of No. 9, I have carried the approach between the house and the lawn, which I think not desirable when it can be avoided. The house should be so surrounded or connected with the lawn that it

would seem to grow out of it; when separated, neither lawn nor house can have their best effect. But I have avoided a very common mistake, that of carrying the avenue around the house, thereby making it an island in a river of gravel. Unless compelled by some imperative cause the house should be connected with some of the retired parts of the place, to which access is had only by private paths, to which strangers or the public would commonly have no access.

I have now, in a general way, described and discussed the principal features of a small country place, excepting the plantation, which is the crowning beauty and the most difficult part of the work. How a place is planted is the test of the skill of the artist. No paths, lawn, flower-beds or other decoration, will make up for badly selected or badly grouped trees and shrubs.

Among the many mistakes men make, none is more common than a tendency to overplant small places with trees, making too dense a shade, and preventing a proper proportion of other improvements.

To avoid this, second sized trees and shrubs should be substituted for trees—introducing a few large trees only where shade or concealment of unpleasant objects is desired. The variety and number of small trees and shrubs is so great that there need be no lack of material, and as they blossom at different seasons, more beautiful groups may be made with them than with trees. In large places shrubs and low trees should fringe the plantations, and fill the curves and bends of paths, and be used to bring out points or continue outlines, much as a lady develops her pattern in worsted work, by a filling of some uniform color.

Trees and shrubs are too often planted in rows and formal lines. I have already referred to the value of variety in all the details, whatever the size of any estate may be, and in nothing is this of more consequence than in the plantation. Nature abhors stiffness and regularity; every group or woodland edge which we admire will be found upon examination to be made up of mixed trees and shrubs which grow at various distances from each other. There will often be in a space ten feet square twenty varieties of shrubs, or half a dozen trees, and in the next ten feet only one or two. By this irregularity the best natural effects are produced, and while we can never hope to imitate nature entirely, we may approach her if we will follow her methods.

When we plant trees and shrubs we should do it by no haphazard method, but carefully consider on a proper plan, what outline and size we would give our group, then see how it may be made, where each kind of tree or shrub is to stand to give the effect we have in mind; then plant in the ground the same trees and shrubs which were found on the plan to be satisfactory.

Nature is ever ready to lend her aid, and however injudicious we may have been in the selection of form of group, or materials to fill it, if we have been careful to give a bold and irregular outline, and a good variety

of species to the plantation, nature will come to our aid, and in time produce an agreeable result.

Trees are too often planted with no regard to their value as color in making the light and shade of the landscape. The planter should use his trees as the artist does his colors; evergreens are the dark colors, deciduous the light. There is also a great difference in the relative color of the individuals which comprise these two classes of trees. Some of the evergreens, like Abies Menziesii and Pectinata, have silvery under surfaces to their leaves, which give the trees a light and sparkling effect, while others like the white or Austrian Pine, are a deep blue or yellow green, and some of the Spruces are almost black.

The deciduous trees differ quite as much in color. We may pass from the purple Maple and Beech to the yellow green of the Acacia and Locust, or the white leaves of the Abele, and as the colors of the foliage of trees varies no more than their form, we can, by grouping trees according to their color and shapes, produce any effect we wish.

The more we study natural plantation, the more plainly we shall see how difficult it is to produce the best effects, and also how large a field of of inquiry and practice it opens to an earnest and thoughtful man; the only limit is the size of the place which is to be planted, and a life devoted to the study of the possibilities which the form and colors of trees offer, will find one at its close, still learning new effects and unable to equal nature with our utmost efforts.

I must leave the subject here, trusting that the arrangement of the groups of trees and shrubs in the plans which I have given as illustrations to this article, will answer any questions which for want of time I must neglect.

DESIGN FOR A DWELLING.

By B. W. Steere, Adrian, Michigan.

AS WILL BE SEEN, this design is not for a large or expensive house, but of such size as was hoped would meet the wants of the greatest number of our farmers. The rooms can be enlarged or contracted however, without changing the plan, or reversed, so that the house can front in any direction.

The cellar is seven feet clear, and under all but the kitchen wing, divided into three rooms, by four-inch brick walls. Eight inch walls would be firmer and more secure, unless they are quite short—is entered from the kitchen under the hall stairs, and should have an outside door at some convenient place.

In summer the cook-stove can be placed well back between open windows, for the cool draft, and there should be a large ventilator in connection with

Fig. 1.—*Perspective View.*

the chimney, and as nearly over the cook-stove as possible, and always open in summer.

In winter the stove can be brought more forward, or where a family desires to live particularly snug at that season, the kitchen can be used for storage, and the stove moved into the dining-room, and placed where cellar and pantry will be convenient.

On large farms where a number of hands board in the family, a small cook-room for summer use could be made between the kitchen and wood-shed, using present kitchen for eating room, &c. This, however, is not recommended, as it is certainly preferable in all respects to build tenant houses, thus leaving farmers' wives and daughters as free from care and hardship as the ladies of other working classes.

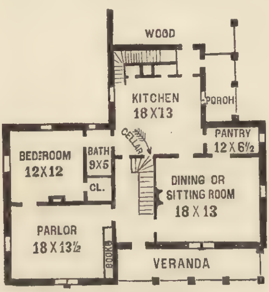


Fig. 2.—*First Floor.*

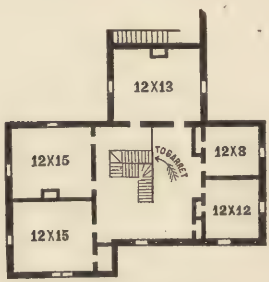


Fig. 3.—*Chambers.*

The hall gives admission to the parlor, dining-room and kitchen, and the bedroom might also be entered from it, through the bath-room, or by making a passage of the closet. The bath-room connects with the kitchen conveniently for hot and cold water.

If more room for stairs is desirable, the hall can be run into the kitchen the width of two or three steps.

Upstairs are four nice bed-rooms, with closets to all, and stairs leading to the garret, which will make a fine room for drying clothes in stormy weather, where they can hang in safety until needed for ironing.

A house on this plan *may* be built of brick, though designed for wood,

that being the material mostly used by farmers in this State. It should, I think, be two stories high, except the kitchen wing—lower story 9½ eet, and upper story 8½ feet, or perhaps 9 and 8 feet clear would do. Tops of roofs to front wings same height, or vary a little, as suits taste. Roofs one-third or more pitch, to project two and a half feet, sealed up plain, or broad ornamental verge board at the gables, and show ends of rafters at the sides.

With the balloon frame, which is perhaps best, and filled in with cheap brick, this house could probably be built for about $3,000. A neat, *plain* inside finish will be most satisfactory in the end, and stories of moderate height are more comfortable, cheaper built, save fuel, and with proper ventilation, as designed in this plan, quite as healthy as those of 12 or 14 feet, which make a plain farmer feel as though he scarcely has a roof over his head.

There is but little expense in carrying out a complete system of ventilation, if thought of and planned in season. Flues may be carried from cellar to garret in connection with chimneys, or at some other convenient point, into which openings can be made just below the ceilings of all the rooms—swinging sash may be made over bed-room and closet doors, and windows made to lower from the top, &c. A little thought and reading will suggest various other helps towards accomplishing this all important and never to be forgotten point.

PACKING GRAPES FOR MARKET.

MUCH OF THE PROFITABLE SUCCESS OF GRAPE CULTURE depends on packing in the best manner for market. Neat boxes, which open with perfectly kept fresh fruit, with none of the bloom rubbed or defaced, will always sell at a higher price than badly or carelessly packed and injured bunches. We visited last year the packing establishments of two of the most successful grape raisers in the country, and are enabled to furnish descriptions of their management. We allude to those of Oliver C. Chapin and E. M. Bradley of East Bloomfield, N. Y.

The packing house belonging to Mr. O. C. Chapin, connected with a thirty acre vineyard, was formerly a large four-story barn, measuring forty by sixty feet, and sixty feet high at the peak from lower basement. During the busy season, thirty persons are employed for packing. The grapes are first picked and placed in flat boxes, with lath bottoms and strips of lath on two sides, with a partition across the middle for stiffening. These boxes are about sixteen by twenty-one inches inside, and

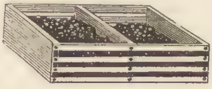


Fig. 1.—*Box for Gathering.*

nine inches deep, but their precise dimensions are not very essential, (fig. 1.) They are commonly filled about one-half or two-thirds their depth, are placed on a long spring wagon drawn by one horse, and without disturbing their contents, drawn to the packing house and placed on a floor made of narrow boards, with wide spaces between, to allow the free passage of air from the open apartment below.

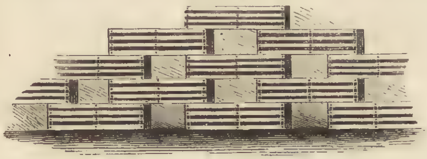


Fig. 2.—*Gathering Boxes Piled for Ventilation.*

The mode of placing them is shown in fig. 2, so as to admit free ventilation. Here they remain two or three weeks, more or less, till packed for sending to distant places. They are mostly packed in round wooden boxes, six inches in diameter and three and a half deep, covered with colored printed paper, and holding about two and a a half pounds each, (fig. 3.) Twenty-four of these are then placed in a smooth wooden box or case, thirteen by twenty-six inches, and eleven inches deep.

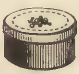


Fig. 3.—*Packing Box.*

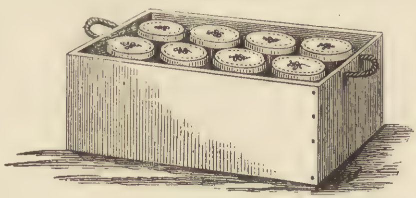


Fig. 4.—*Packing Case with Twenty-Four Boxes.*

Fig. 4 exhibits the appearance of one of these cases when filled, and before the cover is nailed on. Each case holds from sixty to sixty-five pounds of grapes. Sixty thousand boxes were made and on hand at the time of our visit, being enough to hold eighty tons of fruit. They cost about $6 per hundred, and the sixty thousand were worth $3,000.

We published in a former number of the REGISTER some valuable information communicated by E. M. Bradley, in relation to marketing grapes, in which he has been eminently skillful and successful. His vineyard occupies eight acres, and is a model of neatness and good culture. His vines are mostly the Isabella, and are trained on horizontal four-wire trellis, 6 feet high and sixteen feet apart. The vines are nine to thirteen years old and ten feet apart in the row. The ground has mostly a natural underdrainage.

The soil was made too rich in the first place, and it is now necessary to plant the spaces between the trellises with beans, carrots, beets and turnips, in order to reduce somewhat the tendency to make too strong a growth of vine. The bunches were remarkably well grown, some of them having weighed a pound and a quarter, and we measured berries seven-eighths of an inch in diameter.

Great attention is given to neat and perfect packing. Round and square

or oblong boxes are used. The round ones are of pasteboard, and hold one and two pounds each. They are handsomely covered with rich colored paper, with gilt tippings and French colored prints or chromos. They cost about twelve cents each, fig. 5. They are used for the very best berries, and are sent to the best markets. The oblong ones are of wood, five and a half by nine inches, and four inches deep, and hold about five pounds of grapes, (fig. 6.) These boxes, when filled with grapes, are heaped or rounded about half an inch above the level of the top; and the berries possessing some elasticity, they pack closely when pressed, and prevent rattling. When filled they are placed in cases or boxes. Fig. 7 represents one of these cases filled with the square boxes, showing the slight elevation of the lids before the pressure is applied. Each holds eighteen boxes, or about eighty-five pounds, and measures about one foot each way inside, and twenty-seven inches long. The round boxes are packed in smaller cases, so as to hold twenty-four each. There is space enough, so that the pressure does not quite bring down the lids of the small boxes, the elasticity of the grapes keeping all snug.

Fig. 5—*Round Paper Box.*

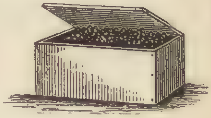


Fig. 6.—*Square Box.*

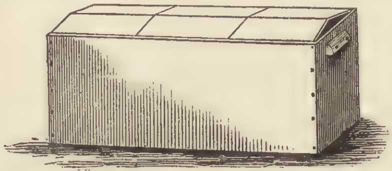


Fig. 7.—*Case with* 18 *Boxes, the lids raised slightly by the rounded packed Grapes within.*

CATTLE TIE.

I GIVE YOU A DESIGN for a cheap, effective and simple cattle tie, which may be new to you or some of your readers. It is preferable to stanchions, as being more humane; while it is always out of the cattle's way, so that they cannot possibly get it fastened anywhere so as to break it. It is easily put on and off.

The leather of which the straps are made should be made wet and *stretched* before using; mine were not done so, and have become a little too long, which we correct by simply twisting one after the other one has been put on the horn.

I use them on my oxen, which stand two in the same stall, upon a raised platform, just long enough for them to stand on, with a gutter behind them to save manure.—J. R. G., in COUNTRY GENTLEMAN.

Fig. 1.—*View from above.*

FRUITS AND THEIR CULTURE.

Growth of Pear Trees.

THE DIFFERENT MODES OF GROWTH in the varieties of the the pear should be well understood by those who would train them successfully, each requiring its peculiar management. Those which have

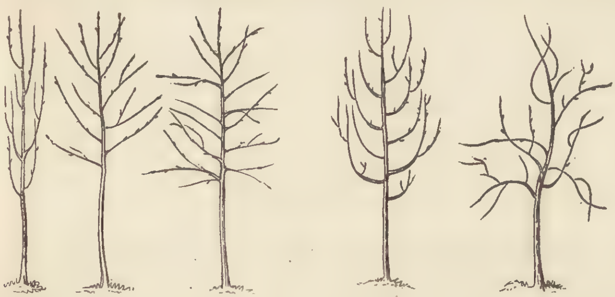


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.

a straight, upright growth, (fig. 1,) as the Buffum, and also the Bartlett, although in less degree, should prune them in such a manner as to give them a more spreading form. The upper shoots should be cut back more freely than in other trees; and, in making a cut, let it be done next above a bud which stands on the outside of the shoot. In removing supernumeraries cut out those which are most upright, leaving those which have a diverging tendency, so far as can be done to advantage. It is proper to remark, however, that less care need be taken with the Bartlett and Buffum than with some other sorts which are less productive, as these two are such enormous bearers as to give the branches a diverging tendency after a few years, the great point being to prevent the tops from running up too high.

Those sorts whose shoots are diverging, as in fig. 2, as in the Seckel, Washington and Boussock, do not require the special care just described, but only enough to preserve a handsome, even head.

Where the branches are spreading, as in fig. 3, as seen in the Lawrence, the pruning adopted in the first instance should be rather reversed, by cutting out such shoots as have a tendency to droop, and leaving those of a more straight and upright character. This care is especially required for the lower branches, where horses are used for cultivating the orchard.

Varieties with ascending shoots, or those which curve upwards, as in fig. 4, instances of which occur in the Tyson and Onondaga, require nearly the same care as in the case of fig. 2. They mostly form handsome heads with very little care, except the removal of one-sided branches, and in preserving an even distribution.

Fig. 5 represents the straggling growth seen in the Winter Nelis, Black Worcester and Beurre Giffard. If these sorts are worked on the stocks as usual, near the surface of the ground, they require much staking to make even tolerably straight stems. Much better trees may be made by grafting or budding them at standard height into such straight varieties as the Buffum. In this way, with the addition of keeping the head in good shape, we have succeeded in making handsome trees of this sort.

Three Cooking Pears.

There are three varieties of the Pear remarkable for their large size, which have been long famed in market for their cooking qualities. They never become soft for table use. These are the Black Worcester or Iron pear, the Catillac and the Pound—the latter known also as Winter Bell and Uvedale's St. Germain. The first is remarkable for its crooked and strag-

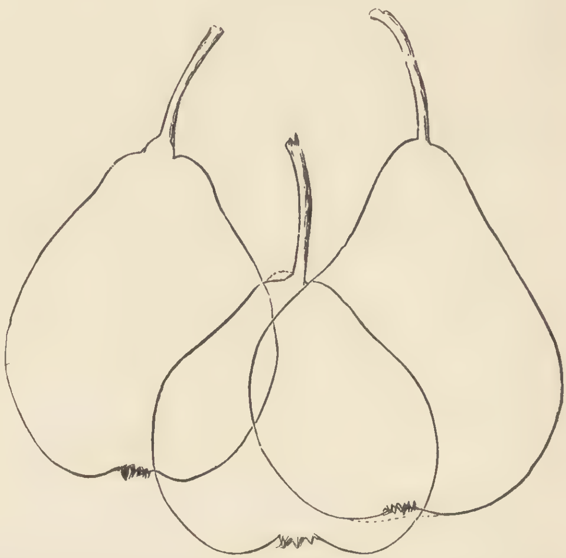


Fig. 6.—*Black Worcester.* Fig. 7.—*Catillac.* Fig. 8.—*Pound.*

gling growth, but the tree is extremely hardy and enormously productive, and some old trees in the neighborhood of Boston have proved quite profitable by the sale of the crops in market. The trees of the two other sorts, and especially the Pound, are straight, vigorous, healthy, upright growers. In the outlines of these varieties, which we here give, they are represented as only one-half the diameter of medium-sized specimens.

Winter Table Pears.

At the present time, no two varieties for early winter use stand higher in public estimation than the Lawrence and Beurre d'Anjou. The latter is an autumn variety, but in a cool room will keep till the first of the year, and is therefore more valued by some as a winter than an autumn sort. Among good winter varieties less noted, we give the outlines of four, reduced

Fig. 9. *Las Canas.* Fig. 10. *Passe Colmar.* Fig. 11. *Beurre gris d'Hiver.* Fig. 12. *Lewis.*

to one-half their ordinary diameter. *Las Canas* is sometimes an excellent pear, but as the quality frequently falls below, it has not been much cultivated. *Passe Colmar* is a well-known and excellent variety, but too often allowed to become poor by over-bearing. A vigorous growth should be given to the tree, and the fruit invariably well thinned out. The *Lewis* has not been cultivated much in this country out of New-England, where under good management, it has proved a fine winter pear—the flesh becoming melting, juicy, and of a rich flavor. As the tree is a great bearer, the fruit is often allowed to become small by crowding, in which condition its good quality is not developed. The *Beurre gris d'Hiver* is doubtless the most valuable of the four, and it may yet stand high on the list of winter sorts. Although usually regarded as a winter sort, we have seen specimens three inches in diameter grown under the best management, assuming a high and excellent flavor.

Leaf and Fruit Buds.

Young fruit growers are often at a loss to distinguish between these two kinds of buds. They consequently make mistakes in pruning by cutting away fruit buds when they would retain them, and vice versa. A young tree, for instance, to which it is desired to impart more vigor would only be checked by cutting away leaf shoots, and leaving fruit spurs. They also frequently wish to make examinations after severe winters for ascer-

taining if the crop has been destroyed, by cutting with a sharp knife through the centre of the buds.

Fruit buds are generally distinguished by their rounded and obtuse form; while leaf buds are slenderer and more acute. In the accompanying figures A. represents a portion of the branch of a pear tree; *b b b* are fruit buds on the extremities of short spurs; *c* is a leaf bud, on a one year's shoot. The fruit spurs are nothing more than stunted shoots, originally produced from leaf buds, but which, making but little growth, become fruit bearers. In the pear and some other trees they are never less than two years old, and they often continue to bear for many years. B. exhibits the appearance of the two kinds of buds as seen on the cherry; *b b* being the rounded fruit buds, and *c c*, the leaf buds, distinguished by their slender and acute points.

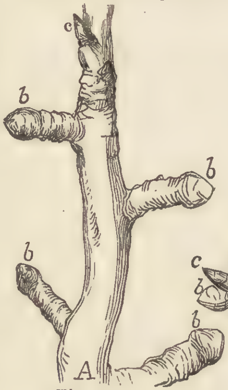


Fig. 13.

Fig. 14.

Cause of the Formation of each.—Whatever tends to a free circulation of the sap, and consequently to a rapid growth, causes the formation of leaf buds rather than fruit buds. On the contrary, whatever tends to retard the motion and increase the accumulation of sap in any part, induces the production of fruit instead of leaf buds. Thus, in the examples just given, as soon as small stunted shoots are formed, they become furnished with fruit-producing buds. The vigorous one-year shoot of the cherry (B) is mostly supplied with leaf buds; but the short spurs on the second year's wood, which are but shortened branches, are covered with fruit buds, with only a leaf bud in the centre.

This also explains the chief reason that young and vigorous trees, whose wood and bark are comparatively soft and yielding, and through whose large and unobstructed vessels the sap flows without restraint, do not bear so freely as those whose older and more rigid parts impede the circulation. A young tree kept in a very thrifty condition may not produce fruit buds for many years; while, if checked in its growth by imperfect culture, it will bear at a much earlier age. Some free growing varieties, as the Bartlett pear, from a constitutional peculiarity, will bear at one-third of the age required for others, as the Dix and Tyson.

Grafting Large Stocks.

Young operators are sometimes puzzled to know what to do with stocks which greatly exceed the graft in size. In order that the line of separation

between the bark and wood may coincide in both, the graft must be placed at one side of the large stock *a*, sloped and tongued for the reception of the graft *b*, their union being represented by *c*. (Fig. 15.) To facilitate the wrapping of the wax plasters, one side and the upper point of the stock are pared off with a knife, before the two are joined, as shown by the dotted line. This is a good mode of grafting any stocks not over three-fourths of an inch in diameter, in the nursery row.

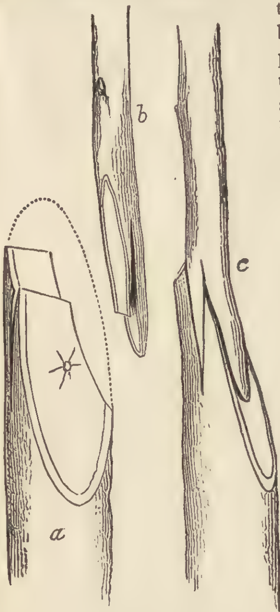


Fig. 15.

Black Knot on the Plum.

This disease, which is now generally admitted to be caused by an internal fungus bursting through the bark, like the rust in wheat, is regarded in some places as the greatest difficulty in the way of plum culture. After twenty-five years' experience, we find less difficulty in keeping our trees free from this disease, although it often makes its appearance, than in eradicating weeds from the soil. It is only necessary to watch the trees closely and cut away freely on its first appearance. Continue to watch and keep cutting if necessary. Cultivators sometimes remark that they have tried this remedy and failed. On inquiry it has generally appeared that they allowed it to spread weeks, or even months before the knife was applied, and then perhaps only a single excision was performed. Keep the eye and the knife ready at all times, and little trouble need be feared.


Fig. 16.—*Black Knot.*

The Apple Worm.

This insect is becoming more formidable of late years in the eyes of orchardists than any other insect with which we are troubled. In many regions of the country it is disfiguring most of the apples intended for market, and vast sums are yearly lost in that way. Dr. Trimble succeeds in destroying large numbers by wrapping the trunks two or three times around with hay rope, early in summer. The insects hide under the rope and are afterwards killed. This is a useful mode of destroying them, but it would hardly answer for extensive orchards, and a part of the insects escape. Turning in swine, which eat the fallen fruit, and thus destroy the

worms, has been found to answer an excellent purpose, and give crops of fair fruit. But few few farmers have swine sufficiently numerous for a large orchard, and sheep have therefore been proposed as a substitute. In the few instances in which they have been tried, we believe they have proved quite successful, but more experiments are needed. They rarely gnaw the bark in the summer season, but all danger may be prevented by rubbing the trunks with blood—refuse meat or liver from the butchers may be employed for this purpose, and will answer as a repellant for some weeks.

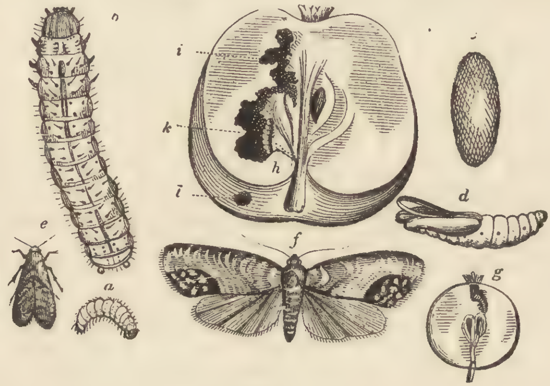


Fig. 17.

The avove figures (fig. 17) exhibit the apple worm in its different stages; *a*, the larva; *b*, the same magnified; *c*, the cocoon; *d*, the pupa within the cocoon; *e f*, the perfect insects; *g*, the young larva, just hatched, after having been deposited within the calyx; *h i k l*, the progressive work of the larva within the apple, till it escapes.*

Four Good Plums.

The accompanying accurate outline figures, drawn carefully from the specimens, represent four good varieties of the plum suited to amateur cultivation. The trees are not sufficiently vigorous and productive for market purposes, but they are worthy a place in all large collections. The *Early Royal*, or Royale Hative, is quite early and of medium size. The skin is of a soft light purple, and the flesh amber yellow, with a rich high flavor. The shoots are very downy. It considerably resembles the Purple Gage, but is some weeks earlier. The *Re Gage* is well known to fruit growers for its sprightly and its pleasant and refreshing flavor. It hardly comes up to medium in size, has a brownish red color, and has a juicy and melt-

*The curculio or plum weevil, when very numerous, attacks the apple, and its peculiar crescent-shaped incisions may be perceived on the skin of tender varieties. The larva, however, rarely reaches the core. But the apple worm never attacks the plum, which has no permanent calyx for the lodgment of its eggs.

ing flesh, quite free from the stone. The *Purple Favorite* is considerably larger, is brownish purple in color, and has a greenish flesh, juicy, melting, sweet and rich, free from the small stone. It ripens about the first of autumn. The growth of the tree resembles that of the Red Diaper. The *Royale* follows the Purple Favorite closely in ripening, and is about the same size; it is reddish purple, and has a rather firm, juicy flesh, with a rich, excellent flavor. The shoots are very downy.

Fig. 18.—*Early Royal.* Fig. 19.—*Red Gage.*

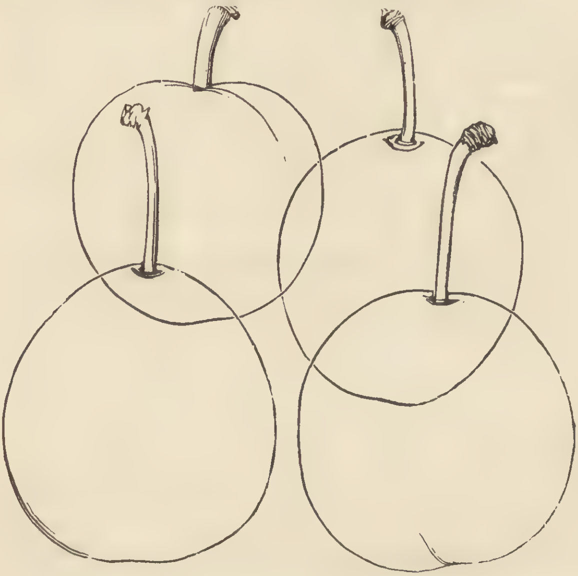


Fig. 20.—*Purple Favorite.* Fig. 21.—*Royal.*

With these four varieties a supply of very pleasant table plums may be kept up for about a month.

Drying Prunes.

Much inquiry having been made of late years, especially where the crops of plums have been abundant, of the best mode of preparing prunes, we copy the following from Siegel's Treatise, giving an account of the French and German process:

" In order to have them fair and glossy, they must be *suddenly cooled*, when withdrawn from the oven.

" The country people in this part of Germany, prepare their prunes by putting them into their bread ovens. I have put up, for my own use, a very conveniently arranged drying apparatus, which, after the experience

of many years, I am induced to recommend; and for the construction of which I give the annexed drawing and explanatory description.

"The vault or exterior of the oven, four and a half feet long, is surrounded by a brick wall one foot thick, so that the whole stove, *a b c d*, (figs. 22 and 23) is exactly six feet every way; the front wall, *n*, being only half a foot in thickness. At the top, the vault is arched over with six inches of brick work at the crown of the arch. The flues *i i*, are about fourteen inches square. The hurdles or trays, *m m*, for containing the prunes, rest upon shelves fixed upon two bearers. It would be better if they rested upon *rollers*, so as to admit of their being pushed in and drawn out, with greater ease. These lines of trays are placed at a distance of six inches from the furnace, so as to keep the fruit from too great a heat; they may be made entirely of wood, but it will be better if the bottoms are of open work, like sieves. Their weight is such that they may be easily managed by a woman; but in preparing prunes on a large scale, let them be made of greater length and breadth, so as to just come within the strength of a more robust person.

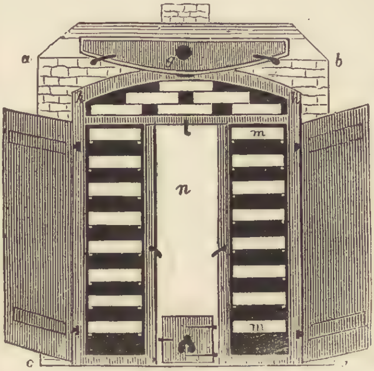


Fig. 22.

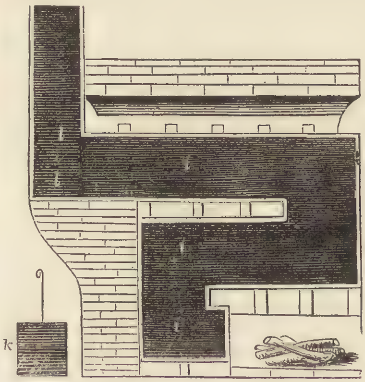


Fig. 23.

"The wooden frame, *h h*, is that on which the two doors are hung. The door, *g*, which covers the arch, (and which is represented in the cut as open and fastened up,) shuts up the front of the upper part of the oven. In the middle of this upper door or flap, is a round vent hole, for the escape of the moist vapor. *k*, is an iron damper or slide, to be placed in the flue at *l l*, in order to regulate the heat.

"A thousand fully ripe Quetsches, (prune plums,) make about ten pounds of dried prunes.

"Plums of different kinds may be dried, either whole or deprived of their

skins and stones. In the latter case they are styled *prunelles.* When the White Perdrigons are used for this purpose, they are merely stoned without skinning ; the latter, from the delicacy of their skins, not being deemed necessary.

" For *prunelles* perfectly ripe and sweet plums are to be taken, and suffered to wilt a little in the open air in order to facilitate stripping off the peel. A better and more expeditious way is to pour hot water over them, and suffer them to steam a few moments.

" The stone is pressed out at the stem end. In the drying ovens, these prunes must be very carefully and gradually dried. They may also be dried, but not so easily, in the sun."

Varieties of the Quince.

The two outlines here given, show, in a reduced form, the two principal old varieties of the quince—the round representing the Orange or Apple variety, and the other the Pear quince. The trees which are found throughout the country have in many instances, been obtained from seed, and hence present a considerable variety of form, with less of quality. Rea's Seedling or Rea's Mammoth is a very large and improved variety of the Orange, being one-third or one-half larger and of excellent quality. The tree is a strong grower, with large foliage. The Angers quince used for pear stocks, bears a fruit similar to the Orange in appearance, but is a little later, and slightly harder in texture. The Fontenay or Paris quince does not bear so good a fruit as the Angers, but more resembling the Pear quince in form and texture.

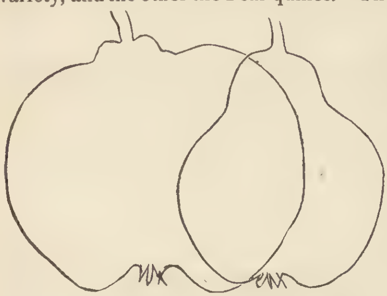


Fig. 24.—*Orange Quince.* Fig. 25.—*Pear Quince.*

Pruning the Delaware Grape.

F. C. Brehm of Waterloo, N. Y., states that the greatest difficulty he finds with the Delaware grape is its liability to overbear—thus permanently injuring the vigor of the vine, and giving an immature and partly insipid fruit. Four years ago his Delawares first came into general bearing. He trained them on the horizontal arm and renewal system, leaving the upright canes when pruned about five feet long. When these bore they had an immense crop. He cut out nearly one-half of the clusters, but still they overbore, and have not got over the effects of it to this day. The next year he cut the canes back to thirty inches, but still they overbore. Then he cut back to twenty inches. In 1866 he cut still closer, with the same trouble—an overcrop of unripe fruit. Last fall he cut them back to three buds, and he now hopes to get some good, well

ripened grapes, and not be overtasking and killing his vines. He says there is an immense number of vines ruined by leaving too much bearing wood and permitting over-bearing, inducing mildew, rot and other diseases, besides getting poor fruit in the eager desire to have a big crop. He further gives his opinion that the defect in the growth of the Delaware, some years ago, was owing to the enfeebling of the vine by over-propagation—an evil now resulting to some of the newer sorts, by the use of immature wood, green cuttings, and anything that will produce a plant.

Improved Strawberry Implement.

The greatest labor in tending the strawberry, is in keeping the runners cut or broken off, as they have to be severed a number of times during the season.

The implement shown (fig. 26) is designed to aid the strawberry culturist in this part of his work. It is made as follows: A handle, (an old hoe or rake handle will answer,) with slit sawed in as shown. B, circular steel cutting blade 5 inches in diameter, with sharpened edge, and one-quarter inch circular hole in centre. Arrange it within the end of the handle.

Fig. 26.

Operation.—Select a dry time when the ground is hard, and the runners will soon wither when severed from the parent stock. Run the blade half round the hill, with a slight pressure; enough only to cut the runner—two strokes should always clear a hill from runners. A rapid workman can clear 18,000 hills per day, which is 10,000 more than could be done in the old way—pinching them off—and will be found far easier to the operator, for the simple reason that you sever with two strokes all the runners on a hill; which by hand would require as many movements as there are runners, besides always in a bent position. With this implement it is the reverse. A small bolt should be used for the axle, and by tightening it the blade becomes stationary, and can be used to remove the plants, and for various other garden operations.—L. D. Snook in Co. Gent.

A Magnificent Orchard

The celebrated Baldwin orchard of Oliver C. Chapin of East Bloomfield, N. Y., is one of the finest young plantations in the country. The trees are mostly seven or eight years old, and have scarcely yet come into bearing. The great extent of these plantations which occupy a gradual slope to the south and east, gives the grounds a rich and magnificent appearance when seen from a distance of a mile or two; and the six thousand luxuriant apple trees, viewed from certain portions seem to present a sea of verdure.

These orchards are kept well cultivated, with the ground mellow and clean, without any other crop. They are plowed twice in the season, about

four inches deep, and harrowed several times. Some think it a waste of land not to raise any crop among the trees ; but the owner looks at it in a different light. By his treatment he thinks each growing young tree is increased in value at least one dollar yearly, even if it bears nothing ; and the trees being thirty feet apart, or fifty to the acre, he receives a return in increased capital at least fifty dollars per acre, or $5,000 annually on his hundred acres of young orchard. There is no question that this is a moderate and fair estimate, and that the trees, when they come into full bearing, will give a profit much greater than this calculation—unless the productiveness of trees, which has existed for centuries, should suddenly fail, which is not probable. In plowing, care is taken not to go too near the trees, and the small unplowed portion is inverted once a year with the spade. When this spading is regularly kept up, it is easily repeated, and one man will go over two to three hundred trees in a day. It is done in autumn. The borer has given some trouble, but care is taken to go over the orchard, and destroy it before it has made progress—one man who is accustomed to the work clearing several acres in a day.

STRAWBERRY MARKETING IN NEW-JERSEY.

By EDMUND MORRIS of Burlington, Author of "Ten Acres Enough," &c.

THE PURCHASERS at fruit stands in the city markets have noticed that their favorite cultivated berries are measured out to them in little wooden boxes or baskets, holding some a pint, and others a quart. But coming for the fruit only they take but little heed at the shape or fashion of the vessel in which it reaches market. Yet a moment's consideration of the vast quantity which finds its way to the great cities, would satisfy any one that the business of supplying these small boxes and baskets to contain it, must be a very large one. As the subject of supplying boxes is now a leading topic with fruit growers, as well as inventors, some details of proceedings in a fruit-growing region will doubtless be interesting to many readers.

The visitor to this portion of New-Jersey, when riding over the carriage roads, will observe in numberless fields that certain little temporary sheds have been set up, generally made by sinking four posts into the ground, connected by plates extending from post to post, on which rests a rough board roof, hardly tight enough to turn water, but sufficient to exclude the sun. These structures are set up in an hour or two, and can be as quickly taken down when necessary to remove them to another field. They are known as strawberry sheds. In picking time, here stands the proprietor or his foreman while the crop is being gathered. He hands out the empty boxes to the pickers, and if a careful man he will have provided light wooden

trays (fig. 1) for each, holding two or four boxes, with a handle for convenience of lifting the tray. The pickers sally forth, and two will generally appropriate a row of plants, each picking on one side until finished. When the boxes have been filled they return them to the foreman under his shed. He carefully examines the contents, seeing that the boxes are full, and that they contain no unripe or imperfect berries. This done, he delivers to each picker as many tickets as he may have returned boxes, and the latter, supplying his tray with empty ones, departs to fill them. The foreman then deposits the full boxes in a chest or crate, and continues to do so until filled, when he fastens down the lid, and lifts it into a spring wagon waiting to receive it. The picking begins as soon as the dew has dried off, and thus continues until the entire ground is gone over. When the field is an extensive one, employing twenty to forty pickers, the foreman is kept busily engaged in inspecting, packing and labelling the chests with cards containing the name of the agent who is to receive and sell the fruit. When the wagon is found to be loaded, it is driven by an assistant to the freight station. The picking over, the motley crowd of women and children step up to the captain's office to be settled with. Each presents his tickets, and the foreman having provided himself with small change for the occasion, promptly counts out the exact sum due to each. The crowd goes straggling back to town with audible rejoicing over the ample pay which all have earned. A smart girl will readily pick a hundred quarts of strawberries per day, for which she receives two dollars, sometimes two and a half. At this rate of compensation for that class of help, there is very rarely any difficulty in obtaining the necessary number of pickers. In fact, the fraternity of fruit pickers is a large one. They look forward to the berry harvest with almost as much anxiety as the berry grower himself. Should the crop fail, the failure falls heavily on the pickers, some of whom depend upon it for paying rent and procuring clothing.

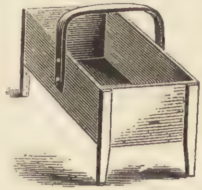


Fig. 1.—*Picking Tray.*

In this location the picking generally closes at about five o'clock P. M. A train of empty freight cars leaves Camden, opposite Philadelphia, in the morning, and comes creeping up the Amboy railroad to Jersey City opposite New-York, stopping at every station to receive the collected consignments of fruit and truck which have poured in from a circuit of several miles around—each basket, crate or barrel labelled with the consignee's name. About six o'clock it reaches Burlington, thus giving us a good long day in which to complete our picking. The quantity of fruit and other articles thus daily gathered at this station is truly wonderful to behold. One of my neighbors has repeatedly sent 200 chests of strawberries to market daily, each containing sixty quarts. Another has forwarded enough in one day to produce him nearly $3,000. Long before midnight the now crowded train arrives at Jersey City, where its contents are ferried over to New-York. While the gas-lights are yet burning, our agent is at

the landing with his wagon, looking up consignments from his various friends. Buyers also are there from all quarters of the city, and speculators who buy from first hands to sell again, all competing for the first choice at the best fruit. The crowd and jumble is tremendous, and the whole scene a very animated one. All the choice fruit is disposed of on the spot, as well as much of the inferior. Well known brands of growers who never send an inferior article to market, are sought after with avidity, and are bought without examination. They command the highest prices and a rapid sale.

It will be understood that New-York is not the only market accessible to the fruit growers of this vicinity. While that great city is within three or four hours of us, there is a population of a million in and around Philadelphia, within one hour's travel by rail, and an hour and a half by several steamboats. In forwarding his produce, the farmer thus has choice of the two largest markets in the Union. But in addition to these the large canning establishments which have sprung up around us will purchase entire crops of all kinds of fruit. They also absorb vast quantities of asparagus, sweet corn, pickles, peas, beans, peppers and tomatoes, and give employment to hundreds of women and girls in putting up these various articles. These establishments have become so numerous as to be a very perceptible sustaining power in the fruit market, preventing the gluts of former years, by distributing the consumption of a dozen sorts of crops over the entire year, instead of crowding it, as aforetime, into the ripening season only. They constitute our third market. The fourth is at our railroad station, where, when fruits and trucks are first coming in, dealers from abroad will be found on the platform, prepared to pay cash for any quantity of seasonable products. The choice of markets is thus a wide one, and cannot be excelled. The difficulty is not where to find sale for what we produce, but to produce it in abundance, and of superior quality. As a general rule the inferior article pays little or no profit. The strawberry crop of 1868 afforded none worth having. It was probably the least remunerative we have ever had. There was an excess of heavy rain while it was ripening, too much ground was planted, and consequently no proper cultivation was given to it. Everything, however, can be overdone. Many have yet to learn that one acre assiduously attended to will pay better than ten neglected ones.

The chests and boxes are, of course, delivered with the fruit. A stranger purchasing is required to deposit a sufficient sum with the agent to guarantee that he will return them. They thus become scattered all over the city and country. There is a body of speculators in berries who are known as "shippers." These buy choice lots and ship them to interior places, Rochester, Albany, Boston, Portland, and other cities whose fruits have not yet ripened, where they frequently command double and even treble prices. But these shippers are permitted to use our boxes, and will sometimes, through carelessness or neglect, retain them several weeks. Meantime our berries continue to ripen and must be picked. This unreasonable

detention of the boxes compels us to keep a large reserve supply on hand to accommodate the new pickings. Where the fruit is sold for consumption in New-York or Philadelphia, the boxes are returned by rail or steamboat in two or three days, if the agent should be vigilant and prompt. But even so speedy a return as this obliges us to keep a reserve of empty ones, as when one despatches a chest to either city, he cannot calculate with any certainty on the day for its return. One of my neighbors, whose berry fields are very extensive, has $1,000 invested in these small boxes.

Then there are agents so neglectful of their employer's interest as to lose large numbers of them, and some who will not scruple to throw the loss on him. When dealing with such agents the loss is sometimes large. Even when our chests come back they are found to contain a most extraordinary jumble of boxes, belonging to a dozen different owners, scarcely any two being alike—one never gets his own. You forward a dozen or a hundred chests with clean, new boxes, and you receive in return a collection of old and dirty ones, gathered up, it would seem, from closets and cellars where they have been mouldering for a year or two. New-York must be nearly filled up with these forgotten wrecks. But the fruit grower has no remedy but to use them, many times being compelled to have them washed out and scrubbed, so offensive is their condition, while many broken ones must be repaired.

This condition of the berry trade has always been an intolerable grievance. The boxes cost $3 to $4 per hundred, and were too costly to be lost, while the delay in getting them back sometimes drove one to borrow from a neighbor, or buy a new stock, or see his fruit perish unpicked. The vexation was constantly occurring, the large grower suffering more than the small one. But an effectual remedy presented itself, in the production of a box at so low a cost that the grower could afford to let it go with the fruit. No doubt the same idea must have occurred to many. Messrs. Beecher & Son were the first to carry it out, by producing a skeleton basket made of stiff straw board, saturated with varnish to prevent absorption of moisture from the fruit. They were sold as low as seventy cents per hundred. I used them with satisfaction; and though necessarily frail, yet they made repeated trips to New-York and back, many of them, however, returning without bottoms, others racked as if they had been stabbed with a meat axe, and others in the shape of cocked hats, until eventually the whole were used up. But they did treble the duty promised by the makers, who ceased producing them in consequence of the enormous advance in the price of paper.

The necessity for a gift box continued to be a pressing one. When preparing "Ten Acres Enough" for publication, the subject was fully explained and the wants of fruit growers stated, with intimations to inventors that here was a fine opening for some ingenious mind to realize a a small fortune by the production of a cheap box. The wide circulation of that little volume brought the suggestion to the notice of numerous parties who saw the subject in a similar light, and who forthwith set about

inventing the desired box. Models of cheap boxes were sent for my inspection, from various parts of the country; some made of paper, others of thin veneer, most of them displaying great ingenuity. Two cheap veneer boxes have since been manufactured, and extensively used. They are really gift boxes, being sold at so low a rate that the berry grower can afford to let them go with the fruit. Many of them are sent from the manufactory in flats, thus packing very closely, and costing but little for freight. As the two pieces which compose the box are shaped and scored for putting together without requiring nails, the process of setting them up into a box is both simple and rapid.

But the invention of gift fruit boxes has been actively prosecuted ever since such wide currency was given to the idea in the volume referred to, and it continues even to the present time. It would seem that no sooner does the inventive talent of our country receive notice that the public is in want of some particular thing, than it springs forward with impetuous eagerness to supply it. New boxes continue to be sent to me, until a large shelf is now filled with them. Two of these, not patented by those who sent them to me, have been patented by others, who must have struck upon the same devices in belief that they were original with them. About twenty have been patented since it became known that such an affair was wanted. Joint stock companies have been formed to manufacture them, large factories built, and many thousands of dollars invested in the business. As gift boxes, cheap enough to give away, some were failures because of excessive cost. Paper has been entirely superseded in consequence of rise in price. Wood only is now used, the thick log is unwound by powerful machinery into a thin veneer, which may be rapidly converted into a perfect box. Whatever imperfections existed at the beginning of this manufacture are being remedied. The great struggle among rival establishments is to reach the ultimatum of cheapness and efficiency, and it is probable the perfected gift box will supersede all others.

Fig. 2 —*Sides of Box.*

At a recent meeting of the Horticultural Society of Vineland, no less than ten new boxes and baskets were exhibited, most of them intended as gifts, with several specimens of cheap crates, also to be given away. There are two factories in this city, in which immense quantities of boxes are annually produced. One of these manufactures the Burlington free box, made by unwinding a bass log into a thick veneer, and simultaneously punching out the two pieces which form the box, ready to tuck together without nailing. A joint stock company control the patent, and have erected a capacious brick building, which is well supplied with ingenious and costly machinery, driven by an eight horse engine. The accompany-

ing cuts represent the two pieces which form this box, as well as the completed box. [Fig. 2, the piece forming the sides, scored or partly cut at the dotted lines, so as to be folded up like pasteboard. The tongue buckles into the two slots, closing like a pocket-book. Fig. 3 shows the bottom—buckling into the two slots at each end. Fig. 4 is the box when finished.

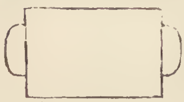


Fig. 3.—*Bottom.*

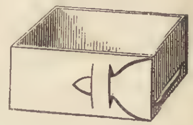


Fig. 4.—*Box Completed.*

In the second establishment a strong box is manufactured, intended to be returned to the fruit grower, and so to last for several years. This is also patented. The sale of these several kinds of boxes has been annually increasing with the extension of our fruit culture, until the business has taken rank among the staples. It is probable that these two factories sell nearly a million and a half per annum. Then in Philadelphia there are other establishments which also dispose of many thousands.

As before mentioned, the fruit-grower delivers his chests or crates at the freight station if for New-York, or on board the steamboat if for Philadelphia, marked with his agent's name. The latter is in waiting to receive them. He advances the freight, a cent and a half per quart from Burlington to New-York, which includes return freight on the empty chests. The charge to Philadelphia is about half a cent per quart. We continue forwarding during the week, and usually every Monday receive account of sales, with a check for the amount. When requested, the agent will remit daily, and will also write or telegraph as to prices obtained, so as to keep us posted up. To large consignees this is sometimes an important matter. The agent's charge for selling the fruit and returning the boxes is ten per cent. Thus the whole business of reaching the market is thoroughly systematized, and is conducted with the least possible trouble to the producer. He devivers his fruit at the freight station, and then all his care over it is at an end. It yields to the railroad company a very large income, and hence they provide every possible facility of low charges, quick transit, and through travel without change of cars. A few years ago this business was but a small item to the railroad; but it has now grown to be an enormous one. It would be difficult to conjecture with accuracy what it will amount to ten years hence; but it is quite certain that it could not be continued, much less enlarged, unless it were known to be profitable.

SIX BEST MARKET APPLES.—A ballot was taken on this subject at the meeting of the Horticultural Society of Western New-York, held at Rochester in January, 1868, with the following result: Baldwin, 43 votes—Rhode Island Greening, 40 votes—Roxbury Russett, 26 votes—King of Tompkins County, 22 votes—Northern Spy, 21 votes—Twenty Ounce, 19 votes—Spitzenburgh and Golden Russett, each 7 votes—Tallman Sweeting and Red Astrachan, each 5 votes—Hubbardston Nonesuch, Gravenstein, Swaar, each 3 votes—Wagener, Seeknofurther, Sweet Bough, Peck's Pleasant, Detroit Red and Early Harvest, each 2 votes.

SELECT FLOWERING PLANTS.*

AGERATUM CŒLESTINUM.—The genus *Ageratum*, (fig. 1,) the name of which is derived from two Greek words, signifying never growing old, from the durable nature of its colors—comprises some of the finest compound flowers, remarkable for their soft, rounded, fringe-like appearance. They are hardy annuals for beds or borders, and are exceedingly useful for cutting; they continue in flower during the season, and are among the finest ornaments of autumn. They also succeed well as winter flowers in the house. The flowers are rather small and grow in clusters, They are easily cultivated, and succeed well in any good soil. Care should be taken, as with all other flowering plants, to give them sufficient room, they should be transplanted or thinned out at least six inches apart. The species represented in the accompanying engraving has light blue, fragrant flowers; the plant grows about a foot high, is of compact habit, and an abundant bloomer. Not being common, no English name has been attached to this plant.

Fig. 1.—*Ageratum.*

MIMULUS HYBRIDUS TIGRINUS.—The plant represented in the accompanying engraving (fig. 2) is remarkable for the beauty of its spottings, resembling the

Fig. 2.—*Mimulus hybridus Tigrinus.*

*For the cuts which illustrate this article, and for a part of the materials, we are indebted to JAMES VICK of the Rochester Seed Store, who has done much towards introducing the rarer sorts.

finest Calceolarias. One variety has the stems and leaves dark brown, with very large, deep yellow, dotted flowers. The plants are not sufficiently showy for the garden, on account of their delicate low growth, but are fine for pots or baskets, or for winter flowering in the conservatory. The seed are quite small, and need care in sowing.

THE ASTERS.—"No class of flowers," says Vick, "has been so much improved within the past twenty years as this splendid genus, and none has advanced so rapidly in popular favor. They are now as double as the Chrysanthemum or the Dahlia, and almost as large and showy as the Pæony, and constitute the principal adornment of our gardens during the autumn months. Give the Aster a deep, rich soil, and mulching with coarse manure is very beneficial. Plants may be grown in the hot-bed, cold-frame, or a seed-bed in the garden. They can be transplanted very easily. Twelve inches apart is the proper distance for making a showy bed of the large varieties; the dwarf kinds may be set six inches or less. The tall, large flowered varieties need a little support, or during the storms of rain and wind they are easily blown down when in blossom. Set a stick in the ground close to the roots, and fasten the stem to it about the centre. The top of the stake should be about 6 inches below the flowers, and it will not be seen. The dwarf varieties are very interesting. Hardy annuals."

Fig. 3.—*New Victoria*

Fig. 4.—*Early Fl. Dwf. Chrysanthemum.*

The New Victoria (fig. 3) has flowers of the largest size. The plant grows nearly two feet high, each plant bearing from twenty to forty flowers with mixed colors. The engraving represents the plant reduced to about one-fifth of its natural size in diameter—of full size one of the flowers would extend across this page.

The Early-flowering Dwarf Chrysanthemum (fig. 4) grows about half as tall as the preceding, or a little less ; it has large flowers with mixed colors.

The Dwarf Chrysanthemum-flowered crown (fig. 5) is one of the most beautiful and finest of its sor , th central petals being pure white.

Fig. 5.—*Dwarf Chrysanthemum-flowered Crown.*

The Newest Dwarf Bouquet, (fig. 6,) appears like a small bouquet of flowers set in the ground, and presents about a dozen different colors mixed. It is fine for edging and for small beds. The plants should be placed about 5 inches apart.

Fig. 6.—*Newest Dwarf Bouquet.*

DWARF FRINGED AGROSTEMMA.—(Fig. 7.)—The name of this genus, from the Greek, signifying "the crown of the field," indicates the showy character of the flowers—somewhat resembling the Pink, but usually growing on taller plants. They are hardy annuals or biennials, bear transplanting well, and should be six inches apart. The Dwarf-Fringed is new, and is of a fine rose color, with a white centre.

Fig. 7.—*Agrostemma Dwarf-Fringed.*

Fig. 8.—*Dwarf Rocket Larkspur.*

DWARF ROCKET LARKSPUR.—(Fig. 8.)—The Larkspurs are a well-known genus of beautiful flowering plants—all hardy—the prevailing colors blue,

white and pink—flowers borne on long spikes. The seed should be sown in autumn, or very early in spring. Among the annual Larkspurs the dwarf sorts make a beautiful and varied mass of flowers—somewhat resembling a bed of Hyacinths. To become well developed, they should stand about 5 inches apart. The larger sorts of course require much more room.

Fig. 9.—*Digitalis or Foxglove.*

DIGITALIS OR FOXGLOVE.—(Fig. 9.)—The genus *Digitalis*, named from *Digitabulum*, a thimble, in allusion to the form of the flowers, of the common or purple species, is a well-known hardy ornamental plant. It is raised easily from seed, and blooms the second year. There is a peculiar and graceful beauty in the form of the spikes, densely and regularly covered with the large, drooping, tubular, spotted flowers. The color commonly varies from white to purple, but we have received specimens from Mr. Vick of a fine nearly clear red. In addition to the common species there are a large number of others, possessing more or less beauty or singularity, mostly growing native in the different countries of Europe.

TEN WEEKS STOCK.—The Ten Weeks or Annual Stock (figs. 10 and 11) presents nearly or quite all the requisites of a perfect flowering plant—good habit, fine foliage, beautiful flowers of almost every delicate and desirable tint, delightful fragrance, early flowering and abundance of blossoms. Flowers in splendid spikes. The best seeds are from German growers of this splendind flower, from selected pot plants, and more than three-fourths will produce fine double blossoms.

Fig. 10.—*Ten Weeks Stock—Dwarf.*

Fig. 11.—*Ten Weeks Stock—Branching.*

The seed may be sown in the hot-bed or cold frame, or in the open ground in May. The plants are easily transplanted when small. They should be removed from the seed-bed before they become "drawn" or slender, or the flowers will be poor. Make the soil deep and rich. Set the plants about twelve inches apart. They are half-hardy annuals.

Fig. 12.—*Double Pink.*

THE PINK—*Dianthus hortensis*—(fig. 12.)—Although closely allied to the Picotee and Carnation, the Pink possesses the advantage of being quite hardy. The flowers are not so large, but are remarkable for the beautiful variegation which they exhibit—the spots, dottings, streaks, blotches and rings running into almost endless forms. They are also much admired for their fragrance.

SCABIOSA OR MOURNING BRIDE.—This genus comprises very showy and pretty half-hardy annuals, excellent for beds and for cutting for table bouquets and other ornaments. Some of the species are a little coarse. Of all colors from almost black to white. The tall varieties are about two feet in height, the flowers being supported on

long, wiry stems. The dwarf varieties are about a foot high. The new Double Dwarf Scabious (fig. 13) has been lately introduced, and quite meets its recommendation. The flowers are of all the beautiful colors of this family. The plant is of a roundish, dwarf compact habit, and a most abundant bloomer until after very hard frosts. The appearance of the plant in blossom is shown in the engraving.

Fig. 13.—*Double Dwarf Scabious.*

DOUBLE HOLLYHOCK—*Althea rosea*—(fig. 14.) — The old single Hollyhock so common in every garden, has of late years been wonderfully improved, and the dense double flowers of nearly all colors which have been obtained by florists, have rendered it one of the finest and most showy of the larger ornamental plants. They are too tall for small beds, but may be placed on the further side of the grounds, or in the centre of large circular beds on lawns, if surrounded by other plants gradually tapering downwards from the centre. The Hollyhock, it is well known, is a biennial, flowering the second year; but specially fine or desirable varieties may be increased and continued by dividing the roots. Unlike some other double-flowering plants, however, nearly all the best seeds from reliable dealers produce excellent double flowers.

Fig. 14.—*Double Hollyhock.*

THE PANSY—*Viola tricolor*—(fig. 15.)—Although the Pansy is a well-known plant, and very eastly kept in cultivation in shaded places, the large and improved varieties are more rare. We have measured flowers of these two inches in diameter; and the

richness and brilliancy of some of the new sorts are scarcely equalled by by any other flower. The Pansy is one of the first blooming plants in spring, appearing almost as soon as the snow is gone, and it continues long after severe autumn frosts. During the heat of summer it blooms well only in shaded places which are kept moist. If exposed to the sun of mid-summer, the flowers are small, but they increase in size and beauty as the weather becomes cooler.

Fig. 15.—*Pansy—Natural Size.*

BALSAM—*Impatiens balsamina.*—One of the most popular and the most beautiful of our half-hardy annuals, but a rich soil and good culture is needed to bring it to perfection. With good care, very few flowers will afford more satisfaction. Sow in a frame or in a sheltered bed in the garden, in the spring, as soon as the weather

Fig. 16.
Natural Growth.

Fig. 17.
Pruned to Five Branches.

Fig. 18.
Single Stem.

is rather warm. Transplant as soon as the second leaves have made a

Fig. 19.
Dwarf—Pruned.

little growth. Set the plants ten or twelve inches apart, and when the side branches appear, pinch off all but three or four, and pinch out the center shoot. Those left will then grow very strong, and the flowers will not be concealed by the foliage, as is the case when the plant is left unpruned. A very good way is to keep all the side shoots pinched off, leaving only the leading one. This will grow two or three feet in height, and a perfect wreath of flowers. Treated in this way, they will bear close planting. The Dwarf Balsams grow only about six inches in height, while the tall varieties will often reach nearly three feet in a rich soil. The engravings show the effects of these different modes of pruning.

Fig. 20.—*Calandrinia.*

Calandrinia.—This is a class of fine, free-flowering annuals, which should be treated as half-hardy, — though some of them are quite hardy. *Calandrinia umbellata*, exhibited in the annexed figure, (fig. 20,) is a perennial, though flowering the first season. Flowers rosy purple.

Since the preceding pages were stereotyped, we have received some additional engravings from Mr. Vick, two of which are here inserted — fig. 21, Flower of the Garden or Florist's Pink, full size—fig. 22, flower of Digitalis, full size, (see page 296.)

Management of Flowers.

The excellent practical remarks which follow are from the pen of Mr. Vick, well known as one of the most skillful and successful florists, and whose flower grounds of nearly thirty acres, near the city of Rochester, are not excelled on the continent for their rare and brilliant collection.

Preparing the Ground.—The soil for flowers should be a mellow

loam, if possible, made deep—a foot or eighteen inches at least—and then the plants will not suffer so much in dry weather. It should also be well pulverized—completely broken up—and made as fine and mellow as possible. It is useless to try to grow good flowers on a poor soil; so, if not naturally rich, make it so with a liberal supply of well rotted manure. Every one—even those who do not keep a horse or a cow—can have a good pile of manure for flowers without cost. Obtain a lot of turf from the sides of the roads and the corners of the fences, place it in a pile, and throw all the soapsuds and slops upon it. In the autumn collect the fallen leaves and put them upon this compost heap. Keep adding to it as you have time and convenience; and when well rotted, you will have an excellent manure for flowers. Always drain the flower garden, so that water will not lie on or near the surface.

Fig. 21.—*Flower of the Garden Pink.*

SEED-BED.—When the conveniences of a hot-bed are not to be had, make a bed of light, mellow soil, in a sheltered situation in the garden; and as soon as the weather becomes settled, and the ground warm, sow the seeds, covering them with a little fine earth, and if very small, sift it upon them. Some one has given as a rule that seeds should be covered twice the depth of their own diameter; that is, that a seed one-sixteenth of an inch through should be covered one-eighth of an inch. Perhaps this is as near correct as any general rule can be. If the weather should prove very dry after sowing, it would be well to cover the beds of very small seeds with damp moss, or what is better, with evergreen boughs. A covering with boards, or almost anything that will afford partial protection from the drying winds and sun, will answer a good purpose, for it must be remembered that seeds do not require light for their germination, and grow quite as well in the dark until they are above the ground. The covering should be removed as soon as the plants are above the soil, or they will become weak and pale. Of course it is designed that plants from the *hot-bed*, *cold-frame* and *seed-bed*, shall be transplanted to the border or beds

where they are to flower, and these helps are intended mainly for *Tender* and *Half-Hardy Annuals.* The *Hardy Annuals* may be sown where they are to flower, though, with the exception of a few varieties difficult to transplant, it is best to grow all in the seed-bed. Some persons succeed very well by starting seeds in the house window in flower pots. A much better plan is to use shallow boxes, because the earth in small pots becomes dry very rapidly, and unless constant attention is given to watering, the plants will be partially or entirely ruined.

Fig. 22.—*Digitalis—Full Size.*

CAUSES OF FAILURE.—In the first place, however, we will examine the causes of failure. If fine seeds are planted *too deep*, they either rot in the damp, cold earth for the want of the warmth necessary to their germination, or, after germination, perish before the tender shoots can reach the sun and air; so that that which was designed for their support and nourishment proves their grave.

If the soil is a *stiff clay*, it is often too cold at the time the seeds are planted to effect their germination; for it must be understood that *warmth* and *moisture* are necessary to the germination of seeds. Neither of these will do alone. Seeds may be kept in a warm, dry room, in dry sand or earth, and they will not grow. They may be placed in damp earth, and kept in a low temperature, and they will most likely rot, though some seeds will remain dormant a long time under these circumstances. But place them in moist earth, in a warm room, and they will commence growth at once. Another difficulty with heavy soil is that it becomes hard on the surface, and this prevents the young plants from "coming up;" or if, during showery weather, they happen to get above the surface, they become locked in, and make but little advancement, unless the cultivator is careful to keep the crust well broken; and in doing this the young plants are often destroyed. If *stiff*, the soil where fine seeds are sown should be

made mellow, particularly on the surface, by the addition of sand and light mould.

If seeds are sown in *rough, lumpy ground*, a portion will be buried under the clods, and will never grow; and many that start, not finding a fit soil for their tender roots, will perish. A few may escape these difficulties and flourish.

TRANSPLANTING.—After the plants in these beds have obtained their second leaves and made an inch or two of growth, they should be removed to the garden beds or border. This should be done on a dull, showery day, if possible; if not, the plants may require shading after removal until they become established. In transplanting in dry weather, always give the plants a good soaking with water, and also the soil to which they are to be removed, an hour or so before removal. Remove them with the transplanting trowel, and disturb the roots as little as possible. If the plants are not too thick, this is not difficult; and in sowing, it is well to have this in view, and sow evenly and thinly. As soon as the young plants come up, if too thick, a portion should be removed. A few plants, with long tap-roots, will not bear removal well. The Larkspurs are difficult; and these and the Poppies, and plants with like roots, should be sown where they are to flower. Still, there are few plants but can be removed when young, with proper care. Sweet Peas, Candytuft, and a few flowers of similar character, that do best if sown as early as the ground can be got ready, should always be sown where they are to flower.

IMPLEMENTS IN RURAL ECONOMY.*

SEED SOWERS.—Those who have been compelled to plant garden seed by the slow process of thumb and finger will find a great relief in using some of the simple hand drills. One of these is represented in fig. 1. It is furnished with a cylinder and brush within the hopper, and these are worked by gearing. It is capable of sowing all the common garden seeds with rapidity and regularity.

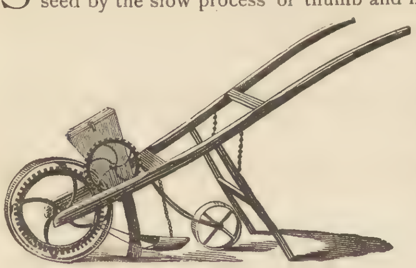


Fig. 1—*Seed Sower.*

The Wethersfield Seed Drill, (fig. 2,) is simpler in its construction, and is furnished with a large

* We are indebted to R. H ALLEN & Co., of New-York for most of the cuts which illustrate this article, who are also able to furnish from their agricultural warehouse the implements figured and described.

roller for pressing the surface, as it passes. It is particularly adapted to sowing onion seed for eld culture.

HAND CULTIVATORS.—Harrington's Hand-Cultivator, for cleaning drilled crops, is represented by fig. 3. It is particularly useful for small field culture, for cleaning such crops as carrots, ruta-bagas, onions, &c., and is becoming a very popular implement. By the removal of the cutting irons and attaching the seed droppers, it is readily converted into a seed sower, now regarded as one of the best in use.

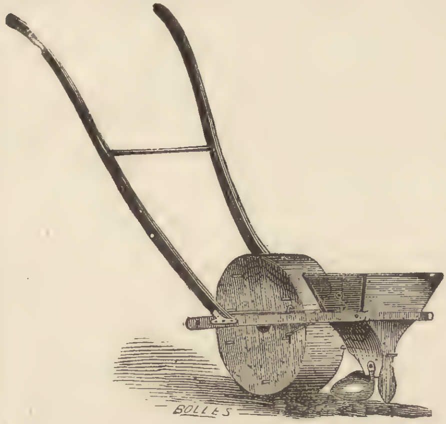


Fig. 2.—*Wethersfield Seed Drill.*

The Weeding Hoe, (fig. 4,) is used for a similar purpose. It is furnished with one or two wheels, and is used in weeding garden or field crops. The wheel or wheels gauge the depth accurately as the knife is thrust forward just beneath the surface, in full view of the plants.

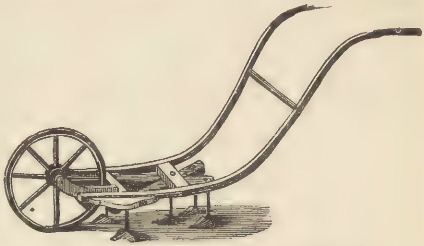


Fig. 3.—*Harrington's Hand Cultivator.*

Fig. 4.—*Weeding Hoe.*

GRINDSTONES.—There is no inconvenience which house-keepers more frequently suffer than from dull knives, dull scissors and other cutting

tools. Fig. 5 represents a family grindstone, arranged in a simple and portable shape, always at hand for obviating the difficulty we have mentioned. They are made of various sizes, from six inches upwards, and are furnished with an iron case or trough, as represented in the cut.

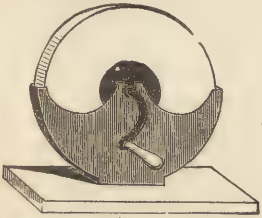


Fig. 5.

Fig. 6.

On a larger scale, fig. 6 shows a farm grindstone hung on rollers, and furnished with a crank, as well as a treadle for turning it. Every one knows the inconvenience of hunting for a man or boy "to turn grindstone" when some light tool is to be sharpened; the foot on the treadle obviates the difficulty, and every one can thus wait upon himself. When heavier work is to be done the crank may be used, and the motion of the treadle added if desired.

Fig. 7.—*Horticultural Tool Chest.*

A Horticultural Tool Chest.—Fig. 7 represents a chest for holding gardening tools, and intended more especially for the use of ladies. They are made of different sizes,—the larger weighing about fifty pounds, and the smaller, neat and portable, about thirty pounds. Tools requiring long handles are made to fit with screws into screw-jointed handles, which may be taken apart to fit the chests. The larger size contains drawers with partitions for seeds, garden gloves, &c.

HAND CART.—The hand cart, (fig. 8,) is a great convenience on every farm, and no one should be without one. It is not so low as the truck

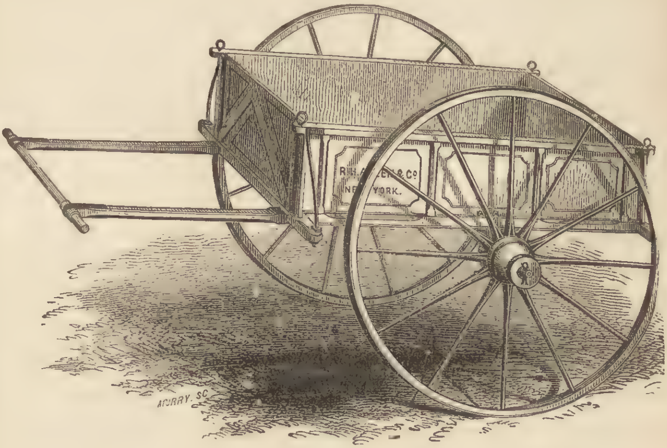


Fig. 8.—*Hand-Cart.*

and wheelbarrow, and is therefore chiefly used for lighter substances, which may be easily lifted into the box. The larger wheels cause it to run much easier, and it may therefore be used about the house, barn, garden, and on the farm generally. It would be difficult to enumerate all the different purposes to which a hand-cart might be thus applied. The one represented in the cut is supposed to have a body about four feet long, two feet ten inches wide, and a foot deep. This is the largest size for the use of one or two men; smaller ones are also useful.

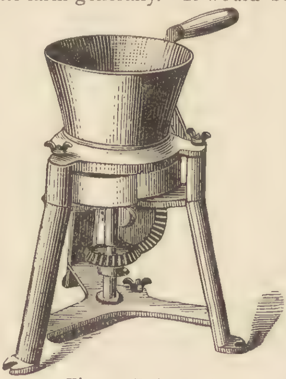


Fig. 9.—*Paint Mill.*

PAINT MILL.—Farmers who have occasion to grind their own paint for outbuildings, or any other substances which need pulverization, whether wet or dry, will find the substantial, portable mill represented by fig. 9, exceedingly convenient and useful. It weighs about twenty-three pounds, and is suitable for ordinary shop use.

WATER BARREL.—Fig. 10 represents a very convenient water barrel, which may hold thirty or forty gallons, mounted on wheels, so as to be

easily drawn when filled with water. It may be used for carrying water for household use, or for watering plants; or it may be employed for

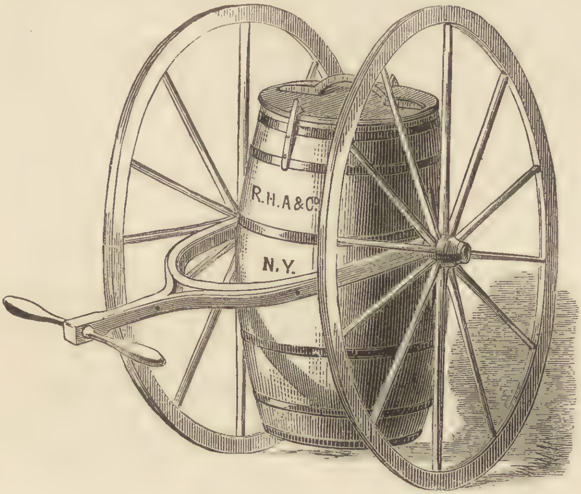


Fig. 10.—*Water Barrel.*

conveying slops or liquid manures to gardens. It may be furnished with a faucet or a hose pipe.

FRUIT LADDER.—There is no convenience which a farmer has less excuse for being without, than a fruit-ladder. Its cheapness—costing but a few dollars at most—and the facility with which it enables any member of the household to reach and select by hand all the lower fruit of a large tree, and the whole of a small one, with rapidity and without bruising, renders it a great desideratum. Fig. 11 represents a simple, broad-based, safe and strong ladder of the kind. The length of the lower rounds tending to making them weak, they are strengthened by the upright bar, which in effect combines three in one. Any ingenious farmer can construct such ladders for himself in winter, or on rainy days.

Fig. 11.—*Fruit Ladder.*

DOMESTIC PRESS.—Housekeepers who are familiar with the laborious

work of pressing lard from cotton bags, making currant jelly, &c., will be glad to find a convenient press which accomplishes such work with ease, certainty and expedition, as represented in fig. 12, which nearly explains itself. The screw is turned by the auger handle above, and the expressed liquid passes out through the channel shown at the foot of the cylinder.

PORTABLE FORGE.—Many farmers do more or less of their own blacksmith work,

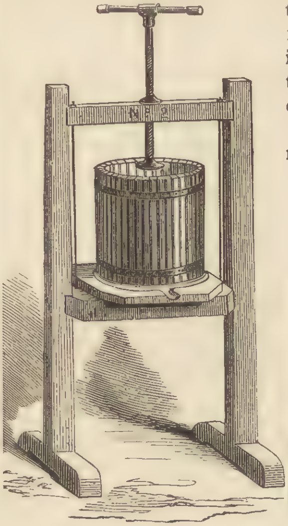


Fig. 12.—*Domestic Press.*

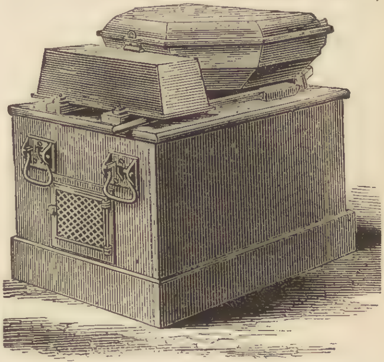


Fig. 13.—*Portable Forge.*

especially if living two or three miles from the "corners" or country village. Fig. 13 represents a new portable forge weighing some 200 or 300 pounds, and furnished with all the usual conveniences of water trough and other fixtures.

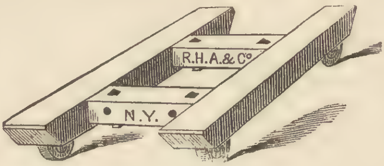


Fig. 14.—*Block Truck.*

BLOCK TRUCK.—Fig. 14 represents a simple, strong frame, running on cast-iron wheels. It is used only on floors or smooth surfaces, and is useful for conveying heavy boxes, barrels, &c., across barn and other floors—the frame being so low that they are easily loaded and unloaded.

GARDEN SYRINGE.—Fig. 15 shows the form of the best brass syringes for garden use. The jets represented below the syringe have roses with different sized holes, which may be readily screwed on, according to the intended purpose, whether for a heavy and strong or for a light and soft washing.

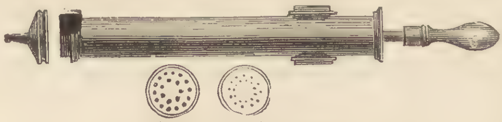


Fig. 15.—*Garden Syringe.*

IMPROVED BEE CULTURE.

Written for the ANNUAL REGISTER by M. QUINBY, St. Johnsville, N. Y.

WHEN WE ARE ADVISED to follow nature strictly in bee-keeping, we should remember that it is not simply leaving a swarm hived by its own instincts in a tree, but by working in accordance with their natures, and turning their instincts to profit. The farmer, as he gathers his Golden Pippins and contrasts them in size and flavor, with the wild crab, will at once perceive the agency of man in the change. The apple seed, without the cultivating care of man, would make anything but a comely and productive tree. It grows irregularly, produces leaves and wood in abundance, but furnishes but little fruit. By a little intelligent interference man controls this growth, and converts it into fruit. With the apple we have reached very satisfactory results. So with our Indian corn. Without assuming to have attained perfection, we find it so changed from its original appearance that it would be somewhat difficult to trace a resemblance.

But when we consider the state of progress in bee culture, we find that far less advancement has been made, and comparatively little actual knowledge obtained of the means of controlling the industry of the bee, and applying it for our own benefit.

The keeping and management of bees has been considered very precarious. Modern science has shown that with late improvements the business may be made as successful as most agricultural pursuits. Our sagacity or experience should indicate what are helps and what hindrances to success. Bees have been kept with some profit in sections of hollow logs, and in the plain square box, when the only way of obtaining the honey was by killing the bees. When it was found that surplus boxes could be added to the hive, and they would often be stored with honey of the purest quality, it was no longer necessary to "kill the goose that laid the golden egg." We could eat the honey and yet keep the bees. This was one important point gained.

Next, some one made these boxes mostly of glass, thus displaying the superior quality of honey, and greatly enhancing its value. Judging from the price in market, there has been no improvement in style or quality for the last few years, though the ingenuity of patent venders has been exerted in this direction most of the time. These boxes can be applied to nearly all hives.

In consequence of the prevalent ignorance respecting the natural history of the Bee, the interior of the hive has for centuries been a dark subject. The introduction of the principle of movable combs has given us much needed light, and enabled us to examine every comb, cell and bee, without injury. When a hive becomes queenless, or the queen barren, the fact can be ascertained, and another provided before it could suffer much from

the loss. Should diseased or foul brood affect any hive, it may be removed at once, and before there is any danger of spreading the infection among healthy colonies by robbing.

Full, populous stocks are alone profitable. They cannot well be too populous as long as there is room for all the bees to work. Should any hive become weakened from any cause, aside from disease, it should at once be strengthened. A weak hive costs ten times the care that a strong one does, and pays nothing back. Where many hives are kept, some of them will be able to spare a comb or two filled with sealed brood. Introduce one, two, or three such combs to a weak hive. If the weather be chilly, and there are not bees enough to keep the brood sufficiently warm, cover the hive with a blanket for a few days. Never allow a poor weak hive to stand uncared for in the apiary.

A queen bee will, under favorable circumstances, lay from 1,000 to 3,000 eggs daily. It requires animal heat to hatch these eggs. A cluster of bees is constantly needed to generate it and to make the comb. Others are required to feed the larvæ, and a very important party are the foragers, which bring in food for the young. A small swarm will be fully occupied with these duties, and if any winter stores are accumulated, more bees are wanted. During spring most of the combs become empty.

In populous stocks the queen fills them with brood, which emerges, and is about ready for the first yield of clover. Now if no further room is provided than in an ordinary sized hive, they will probably send out a swarm or two. This is a natural consequence.

It has been ascertained that if abundant room be provided by surplus boxes being placed in immediate contact with the main combs of the hive, the bees that might go off in the swarm would usually remain at home and fill the boxes. This use of surplus boxes at the sides, as well as on the top of the hive, with clean guide combs properly adjusted, has a tendency to prevent four-fifths of the swarms as demonstrated by Mr. Hazen's hive, and when no swarm issues it is reported by Mr. H. that the average yield per hive will be 100 lbs. If an increase of stocks is wished for, the product of one will buy several.

As a further security against swarming, a device has been offered which prevents the queen from leaving. A pen or yard is made in front of the hive, 18 or 20 inches square. Nail together strips that will make it about three inches deep, with floor of thin boards, excepting a strip four inches wide next the hive, which should be of wire cloth for sifting out dust and for ventilation. Around the top on the inside fasten a strip of tin three inches wide, in such a way that it will be parallel with the floor, and thus prevent the queen, whose wing should be clipped, from crawling over. She will creep up the side, but being unable to hold fast to the underside of the tin, will fall back, and finally return to the hive with the bees that will not go far without her. The upper side of the tin should be painted some light color. Cut a place for entrance on one side of this pen, to correspond with the entrance of the hive. To prevent their rearing a

young queen that may supersede the mother, and can fly, it will be necessary to open the hive once in eight or nine days, and remove all queen cells, or if it is wished to replace the old with a young queen, let one cell be left. There will be no risk of a swarm in that case, and when she begins to lay clip one wing.

Whoever handles bees on the improved method, must of necessity possess a little more courage than when using the old box. We want to inspect the whole interior of the hive, and not be alarmed at the first approach of an angry bee. If any person, after reading the description of all necessary means of protection and modes of controlling their disposition, cannot work among them without nervous fear of stings, he should allow others with more energy to do the work.

No one can successfully prosecute bee culture unless sufficient time be set apart for their care, the same as a farmer expects to properly cultivate his various crops, if he can reasonably anticipate profitable returns. One man can take the necessary care of several apiaries a few miles apart. Once a week is as often as such yards need be visited by an expert.

For means of protection in the necessary operations among bees ample provision has been made. To protect the face, a net or veil must be made of the thinnest possible material of sufficient durability. A yard and a half, sewed together at the ends, and gathered with an elastic cord, will slip over a crown of a hat, and form complete protection to the head when tied close around the neck. To facilitate clearness of vision a piece of wire cloth, fine in wire, and coarse as possible in mesh, should be inserted directly in front.

As a further help in controlling them, we want smoke. That produced by burning rotten wood answers an excellent purpose. Any hard wood sufficiently decayed is suitable. It should be sawed or split into pieces an inch square, and thoroughly dried. A piece properly prepared, and a foot long, will burn for hours without blazing. The smoke of a roll of cotton rags will do equally well. Also common smoking tobacco spread on cotton cloth, and fastened in the form of a roll, will furnish a smoke that will subdue angry bees quicker than anything I ever tried. Yet they seem to remember it as something very unpleasant, and associate it with some disturbance of the hive, which is resented accordingly. The smoke of wood does not subdue them so readily, but is preferable.

To direct the smoke in any desired direction, a suitable tube must be inserted through the wire cloth in the bee veil, and secured in such a manner that the end may be held in the mouth. It is then ready for use at any time.

When ready to operate, set fire to the rotten wood, put on the veil, and, if desired, protect the hands with rubber or woolen gloves. Whenever possible, all operations should be performed in the middle of the day. It is not always best to blow the smoke immediately on opening the hive unless there is some decided manifestation of anger, but be ready to drive them back if they rush out, by holding the stick near, and blowing the smoke directly

upon them. Very often in removing the honey-board, or side of the hive, it is loosened with a snap or jar, which will irritate the bees. All movements, especially loosening frames from their fastenings of propolis, should be conducted with care.

These facilities for examining and controlling bees I consider to be at the foundation of improved Bee culture. I have not minutely described any one hive, but have simply given the principles on which the best are based. By being able to control the swarming, and thus realizing the desire for a non-swarmer, one man is enabled to manage alone eight or nine large apiaries a few miles apart.

Heretofore when there were more bees than could be kept in one yard, they had to be taken elsewhere at the expense of hiring a man to attend to each yard during the swarming season. With the best help that could be obtained, there was often a loss of many swarms.

Suppose a person should put in one yard fifty hives, or as many as he could look over in one day, and had seven, eight or nine yards. At an average of 50 pounds from a hive, there would be an aggregate surplus of from 18,000 to 20,000 pounds. Mr. Hazen reports 500 pounds from four hives in one season. At the prices for which honey has been selling for the last few years, a man willing to work would be well paid for his labor; and he *must* work. He must thoroughly understand that not only labor but energy, care and skill are absolutely essential to success.

FEEDING AND REARING DOMESTIC ANIMALS.

System of Feeding Sheep in England.

The Norfolk (England) correspondent of the Country Gentleman gives the following account of the system of management by which sheep are there made to bring from 50 to 60 shillings sterling per head when only one year old:

"At the outset, it may be necessary to inform American farmers that our flocks are out in the fields the whole year round, with the exception of temporary shelter for the ewes in lambing time. From the middle of April to the first week in October, they are feeding on natural pasture, or artificial grasses sown for one year's lay. During the winter months, they are folded on turnips—usually white turnips for the first month; afterwards swedes cut for them, and fed in troughs, together with a regular allowance of dry food: linseed cake, cotton cake, beans, peas, oats, bran and malt dust, mixed with hay cut into chaff, are the substances commonly employed. My plan is to let the lambs run through a hurdle away from their dams as early as possible; supply them with a few cabbages or turnip tops; at the same time let them have low troughs, in which we always keep fresh broad bran, and if possible, a little sweet leafy clover hay, cut

into chaff, and mixed with the bran. They will begin to eat this when very young, and it will then induce them to eat a few beans or peas, ground and mixed with the bran; but I do not find they care much for the corn until they get several weeks old. I have begun to give some of my oldest lambs a few beans, the last day or two, but they do not care to eat them, and I think the bran and chaff is quite as good for them. I like them to have the most corn when they begin to eat a large quantity of *young green food* or *mangel wurzel*, and I generally begin to reduce the corn when on good sound fresh green feed, which they usually are on before they are weaned. After they are weaned, I give them a little more for the first week or two, unless they are on very good feed, such as cinquefoil or a variety of seeds; I like, if possible, to keep some mangel wurzel for them after they are weaned. I very rarely give my ewes any corn, either before or after lambing, (except a few old broken-mouthed crone ewes,) but if very short of turnips, I sometimes give the ewes with twins a few oats, especially if I have not much hay or chaff, and when oats are cheap, which they certainly are not now. I generally take off all the corn from my ewe lambs* a short time after they are weaned, but continue it with the ram lambs, and some or all of the wethers; after the rams and wethers begin rape or turnips in the autumn, I begin to increase their corn and dry food, until they have a pint of corn and cake each per day, which I think is not too much, especially as they are kept on the turnip land all the winter, and some of my land is heavy, bad feeding ground. *I always try to avoid letting any of my sheep or lambs have any sudden change of food;* and I have no doubt a variety of food is best when it can be obtained, and, in summer, with good water to go to as they like. Half-bred sheep, having a larger frame to support than South-Downs, consume more food; and in order to bring them up to from 70 to 90 pounds weight (of mutton) at a year old, they must be allowed linseed cake, or some other purchased food, at an average cost of sixpence a head per week—for 52 weeks, 26 shillings. It will readily be seen that a considerable proportion of this outlay should be charged to the succeeding crops. An old proverb says: 'The sheep has a golden foot.' Certain it is that the arable land of this county, some of which has been in cultivation for centuries, could not be kept up to its present state of increasing fertility, except by the aid of flocks of sheep, fed in the way I have here indicated."

The advice contained in the italicized sentence of this excellent paper on sheep management, should be constantly borne in mind by those in care of a flock; serious loss may be sustained by violent and sudden changes from semi-starvation (say) to a plentiful supply of succulent food.

Experiment in Feeding Leicesters and Merinos.

A very interesting experiment in Feeding Sheep was conducted during the winter of 1868, by Mr. Jurian Winne of Albany County, an account

* These being highly bred South-Downs, and intended for breeding purposes, do not require forcing. I find they are apt to get too fat on grass alone.

of whose usual practice has been published in a previous number of the Annual Register (Rural Affairs, vol. IV, p. 272.) The present trial was made with the view of throwing light upon the comparative merits of the Merino and Leicester breeds for the production of mutton—it being often claimed for the former that if they weigh less than English sheep, they also consume less food and are equally profitable to feed.

Two lots were set apart, consisting respectively of 60 Canada Leicesters and 61 Merinos; they were weighed Feb. 10th; a careful account was kept of all the food they consumed during the continuance of the experiment, forty-six days, to March 28, when they were again weighed and sent to market. These numbers were thought to represent fairly the whole, and were taken as avoiding the trouble and additional risk of error, which would have been incurred by larger numbers. The experiment began after both lots had been got in good progress—the previous and subsequent treatment of both having been precisely alike. The Merinos were an extra good lot, the one hundred and eighty having been selected out of six hundred—and no complaint could exist against them, as we know by personal examination, on the ground of being below the best merits of their kind. The following are the figures as regards weight, &c.:

Feb. 10—Sixty Coarse Wools weighed,	8,870 lbs.	
March 28— do. do.	9,878 lbs.	
Gain in 46 days,	1,008 lbs.	
Total cost of feed, (hay, grain, oil-meal, roots, &c.,) for the 46 days,		$174 43
Feb. 10—Sixty-one Fine Wools weighed,	6,909 lbs.	
March 28— do. do.	7,389 lbs.	
Gain in 46 days,	480 lbs.	
Total cost of feed as above		$144 78

When both lots were sold, March 31st, the former realized 10¾ cents per lb., and the latter 10½ cents.

A calculation in simple proportion will show that if the coarse wools gained 1,008 pounds at a cost of $174.43 for feed, the gain of the fine wools at the same ratio upon an expense of $144.78, should have been 836 pounds, whereas it was only 480 pounds, or a little more than one-half a proportionate amount as compared with cost. As compared with live weight, Feb. 10th, the coarse wools gained 11⅓ per cent. in the forty-six days—the fine wools not quite 7 per cent.

Stall Feeding Cattle in Eastern Pennsylvania.

In few parts of the country is there better farming, or more attention given to feeding cattle, than in Chester County, Penn. A correspondent of long experience gives us the following excellent suggestions derived from his own practice and that of his neighbors:

Experience has shown that cattle housed all the time will accumulate more fat, and be better contented, than if allowed to go out and become chilled every day for water; in fact, I consider it a loss of several days' feed for a steer to get loose. As to fatten an animal with economy, comfort and contentment is of as much importance as care and food, the charge

of the stock is confined to one trusty man, who must be up early and late, feeding at precisely regular hours, and no strange persons are allowed among them. They soon become accustomed to the voice of the feeder —even know his step, and in a few days become perfectly docile and contented, and commence to put fat on rapidly. Some skill and experience is required in first chaining the cattle up, to regulate them according to their dispositions. This is what we call bossing them. Twenty cattle are turned into the barnyard, enough to fill one stable. Some meal or salt is placed in the centre of the yard, and the steer that drives the rest away and eats, is the first boss. He is turned into the stable and chained at one end. The next boss—that is, the next master steer—is placed beside him, and so on through the whole twenty. They are bedded and the stables cleaned out every day, making large quantities of excellent manure, which is drawn out of the stables on a sled, with a quiet old horse, and placed under a large shed, where it is kept trampled solid by a few sheep or calves. One load of this manure, containing, as it does, all the solid and liquid excrements of the cattle, is of more value than four of such as I described to you above, under the old system. My experience has shown me that cut corn fodder is the cheapest and best food for cattle that are fattened on meal, as its slight constipating character counteracts the effect of too strong feeding on grain. I have fattened prime beef without giving them a mouthful of hay all winter, which, at the present price, is a great economy. I use a telegraph cutter, No. 3, having four knives, cutting about one-eighth of an inch long. It will cut about 500 bundles of fodder per day, with two horses and two men. This will last 80 cattle about one week, feeding some hay with it. The temperature of the stable should be kept as uniform as possible, and if a little care is taken, it need never fall below the freezing point in the coldest weather, as the animal heat generated by so many cattle, creates a warmth all through the building. I have never had a sick steer for the past five years that I have been feeding in this manner, and their good appetites and glossy coats attested to their general welfare. An experienced cattle feeder, and one to whom I am mostly indebted for this system of feeding, informs me that he has not lost a steer in eighteen years that he has been stall-feeding cattle this way.

Cattle feeding is not very profitable business under any circumstances, if you leave the manure pile out of the balance sheet, but some such method is an absolute necessity with us, who inherit the over-cropped soils of the Eastern States, and if we can obtain market price for our grain, we should be contented knowing that every bushel we feed, if properly applied, will raise two bushels another season, and keep the land increasing in value and productiveness. Another point to be looked at is this: There is no profit in keeping any kind of stock that is not improving on your hands. A good steer, that cost you eight cents gross in the fall, say he weighed 1200 pounds, if wintered in a rough, careless manner, will lose 100 pounds by the first of May. Here is a direct loss of $8 of the purchase money,

and a consequent depreciation of 50 cents per hundred in his value, making a loss of $14 on him, in addition to his feed. Now take the same steer, house him carefully, and feed him $25 worth of meal; he will eat 50 per cent. less hay and fodder, and will weigh 1450 by the first of May, and will be worth at least 10 cents per pound. Here you have a valuable lot of manure, your corn paid for, and $24 besides.

Description of Barn for Stall Feeding Cattle.

The same correspondent furnishes the following plan of the barn in which his cattle are fed:

Our barns are double decked, built on the slope of a hill—the stables, consequently, partly below ground. They should always be provided with plenty of windows for light and ventilation in warm weather. The stalls are placed lengthwise, as in the accompanying diagram, which is a sketch of the ground plan:

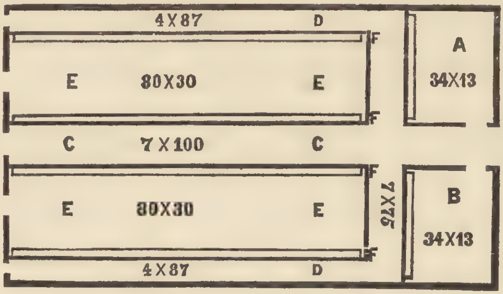


Fig. 1.—*Plan of Barn.*

The building is seventy-five by one hundred feet square. A is the horse stable, with stalls for six horses. B is the cow stable, accommodating six or eight cows. C C is the main entry, running lengthwise through the barn, seven feet wide, floored with brick placed on their ends. D D are two smaller entries, running on either side of the cattle stables. These stables are 30 feet wide, including rack and trough. The cattle are chained, four feet apart, to a long trough, sixteen inches wide and eight inches deep, running lengthwise of the stable on both sides. Each trough has twenty cattle, chained four feet apart, without head stalls, making eighty cattle, six horses and six cows under one roof. The stock is housed about the first week in December, and are never loosened until they are sold or turned out to pasture, about the 1st of May. They are watered in the trough from the points F F, where stop-cocks are connected with the supply cistern. They are fed three times a day, on cut cornstalks, corn meal and bran, or corn and oats ground together—beginning with a moderate feed, say three quarts, and increasing the supply as their digestive organs become accustomed to the change of food.

Experiment in Cooking Feed for Hogs.

A Wayne County farmer has accurately tested the results of cooking feed for swine, and presents the following figures :

The experiment referred to was conducted with two pens of hogs, which were carefully weighed, the gains noted, and the food in each case also weighed or measured. The hogs selected for the experiment were all grade Chesters, and, with one exception, nearly of the same age, weight, condition, &c. Pen No. 1 contained three hogs, whose live weight was nearly 1,000 pounds. They were fed all the corn they would eat up clean—the three consuming forty-five pounds of corn daily. After being fed seven days, they were again weighed, when it was found that they had gained ten pounds each. By calculation we find that during the seven days this pen of hogs consumed five bushels and eight quarts of corn, costing $6.66. The gain being thirty pounds, we see that thirty pounds of pork cost $6.66, and would have sold at the time for $2.55. Pen No. 2 contained two hogs, one of which weighed alive six hundred pounds, and the other nearly four hundred pounds. They were fed all the cooked meal they would eat—the two consuming twenty-five pounds of meal per day. The respective gains of each were five and seven pounds, the smaller hog gaining five pounds per day, and the larger seven pounds.

By calculation we find that the pork made from whole corn cost a trifle over 22 cents per pound, while that made from cooked meal cost 4½ cents per pound.

I am aware that seven pounds may seem to some to be an extravagant gain for a hog in one day, but it must be remembered that this was a very large hog, and the experiment conducted in very favorable weather. I succeeded in increasing the gross weight of this hog five pounds each day for weeks together in rather unfavorable weather. I believe we can make hogs profitable, if we feed a few all they can eat, but when we undertake to keep fifteen hogs upon the feed of five, we must expect disappointment and loss. It is also equally essential to have *a good breed* of hogs to feed.

SWEEPING CARPETS.

SWEEPING CARPETS too often wears them out rapidly. It is obvious to any one that a brisk, daily brushing over the whole surface must wear away and carry off more woolly particles than the occasional stepping of feet during the day without the rubbing and scraping given by the broom. To allow sand and grit to accumulate on the surface, and to become ground into the fibres by the pressure of sole-leather is, however, worse than sweeping. They should therefore be always kept clean. Men who object to large carpet bills should provide themselves with slippers, and not come in with muddy boots. It is a matter of economy with them

to pay \$2 or \$3 in the purchase of slippers, rather than a hundred or two for ingrain and brussels. This perhaps would be a stronger consideration with some, and exert a more controlling influence, than frequent sharp reproofs from the mistress of the interior.

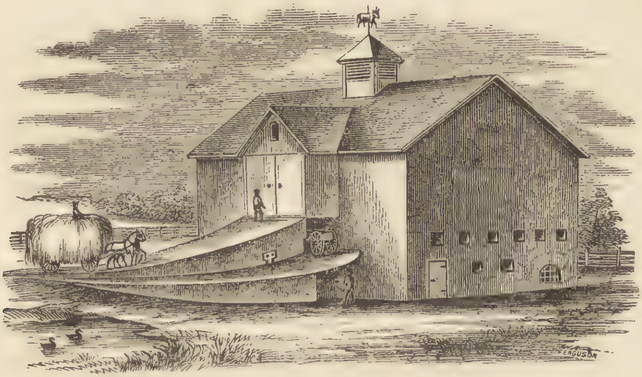
There are different ways of sweeping carpets. The most objectionable is performed as follows: The operator first places the broom perpendicularly upon the floor; then with a quick, thrusting motion the lower part is pushed forward and thrown upwards, carrying the dust with it in large clouds, until the air of the room is filled with it. The brush of the broom, by a frequent use, thus becomes bent, somewhat in the form of a hook, as shown in the accompanying figure, (fig. 1,) at the same time that it is gradually broken off and worn out. The dust which fills the air gradually settles upon chairs, tables, bureaus, writing desks, cases of books, picture-frames, clocks, maps, looking-glasses, &c. The process thus consists virtually in merely elevating a stratum of dust on the carpet and placing it on all these different articles of furniture. After some minutes the duster passes around and the stratum is removed to its original position on the floor, thus making a sort of perpetual motion resembling the great circulation of moisture from the earth to clouds, and from clouds to rain back to earth again.

Fig. 1.

Fig. 2.

A much better way for performing the work is to place thc broom upon the carpet in an inclined position, with the handle inclining forwards; drawing it quickly over the surface in this position, and scarcely raising it from the floor, will prevent the rising of but very little dust. In order to do the work effectually, however, the motion should not be given by long strokes, but by a quick succession of short ones. It would be worth fifty dollars to any housekeeper who does not understand the business, to see these two modes distinctly performed. By the former or thrusting mode, the coarser dirt, or that which does not rise in the air, is shot ahead several feet, and spread over a large surface. By the latter or drawing mode, it is kept more compactly together, something like the winrow of hay in the meadow. The broom, instead of being bent around like a hook, as above stated, is kept straight and smooth, and lasts several times longer. (Fig. 2.)

In libraries, cabinets, &c., where dust might badly injure or wholly spoil the specimens and books, it is better to procure a patent carpet-sweeper, merely using a broom or brush to clean out the corners and sides.



A THREE-STORY BARN.

H. W. CHIPMAN furnishes to the COUNTRY GENTLEMAN the following plans and description of what he terms a "Model Barn," belonging to Alfred Tredwell, Esq., of Madison, Morris Co., N. J., who carefully examined previously many of the best barns of Pennsylvania and other States.

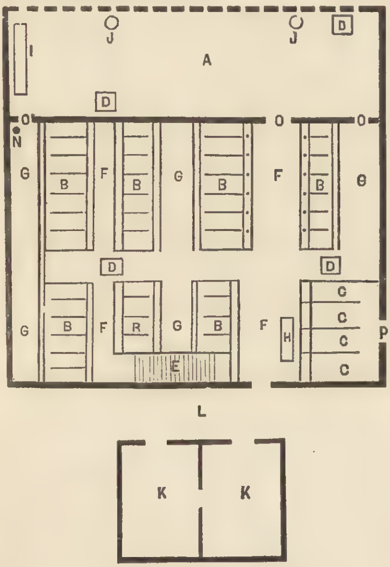


Fig. 2.—*First Floor or Basement.*

General Dimensions.—The barn is 64 feet square. The first story is 8 feet high in the clear; second, 10 feet; third, 16 feet, and roof 16 feet. The walls of the first story are 20 inches in thickness, the second story 14 inches, and the third 12 inches.

Situation.—The barn is located at the foot of a slight declivity—so slight indeed (8 feet) that the second story floor is upon a level with the high ground in front of the building. The third story is approached by an easy grade of one foot in ten; so that heavily laden teams can readi-

ly enter either floor of the building. The first story of this barn, although nominally a basement, is nevertheless free from the disadvantages generally connected with cellars, as it is wholly above ground, and separated from the surrounding bank. The floor of this story is of concrete — readily cleansed, and never decaying.

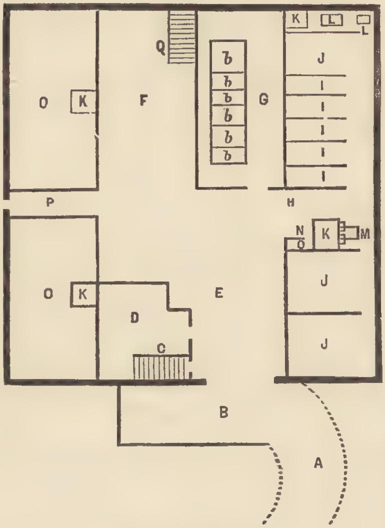


Fig. 3.—*Second Story.*

The chief feature of the second story is its horse stable. The dimensions of the regular stalls, as indicated in the plan, are unusual ; but long experience, and at times a very expensive one, has taught Mr. T. that a stall four feet wide will invariably prevent a horse from casting himself, although giving him ample room to lie comfortably, and that one 11 feet deep renders it very difficult, if not impossible, for horses, properly tied, to kick each other.

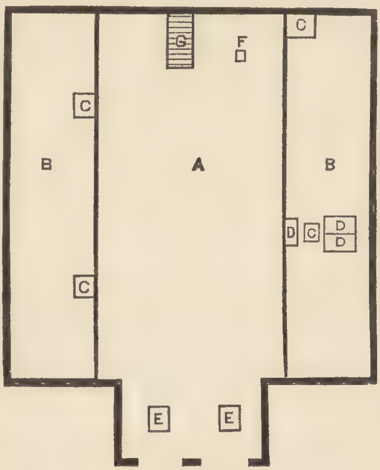


Fig. 4.—*Third Story.*

As a farther precaution, when the horses are all in for the night, a strong rope is passed through rings at the back of each stall, four feet from the floor, thus effectually *boxing* each horse, and, in case any become untied, preventing their leaving their own stalls and molesting their neighbors.

In the third story, the great floor, 32 by 64 feet, with immense bays on either side, is a prominent and exceedingly valuable feature of the whole establishment, and furnishes ample room for many farm

operations, which, for lack of suitable shelter, are oftentimes necessarily performed during extreme weather out of doors. Here were noticed a railway horse power, a threshing machine, a circular saw, a grist mill, fanning mill, Daniel's hay cutter, a cornstalk cutter and masticator, and scales. By nailing strips to the posts supporting the roof, more or less of this floor, as the requirements of the season demand, can be converted into mows for storing hay or grain.

EXPLANATIONS OF PLANS.

Fig. 2.—*First Floor or Basement.*

A.—Shed 17 by 64 feet; being a portion of the main building, its roof formed by the story above.
B. B. B.—Cattle stalls, varying in depth from 4 feet 8 inches to 6 feet 6 inches. Two-thirds of these stalls are provided with ordinary cattle chains; the remainder have upright shifting stanchions.
C. C. C.—Stalls for farm horses, with entrance at P., thus separating them entirely from the horned stock.
D. D. D.—Hay and straw shoots.
E.—Stairway connecting first and second stories.
F. F. F.—Passage-way in front of stalls.
G. G. G.—Passage-way in rear of stalls.
H.—Feed-bin for horses.
I.—Water-trough.
J. J.—Pillars supporting rear of building.
K. K.—Root cellars, each eleven and a half by twenty feet, wlth ten feet ceiling; total capacity 3,312 bushels.
L.—Covered passage-way between main building and root cellars.
M.—Cistern for liquid manure, receiving drippings from shed A and yard beyond.
N.—Penstock delivering water from neighboring spring.
O. O. O.—Doors for horned cattle.

Fig. 3.—*Second Story.*

A.—Approach to this story, being on a level with grounds in front of the barn.
B.—Covered entrance.
C.—Stairs leading to basement.
D.—Harness room.
E.—Floor for harnessing and unharnessing horses.
F.—Light wagons and carriages.
G.—Granary, 16 by 34 feet, with bins, *b b b*, of various sizes, and filled by means of a shoot from above where the grain is threshed.
H.—Sliding door leading to horse stable.
I. I. I.—Stalls 4 feet wide by 11 feet deep.
J. J. J.—Box stalls for stallions and sick horses.
K. K. K.—Hay and straw shoots.
L. L.—Trap-doors for straw and Manure.
M.—Box for mixing feed, into which empty grain-spouts from floor above.
N.—Pump.
O. O.—Bays for hay—filled from third story.
P.—Passage-way to side door.
Q.—Stairs to third story.

Fig. 4.—*Third Story.*

A.—Floor, 32 by 64 feet.
B. B.—Bays.
C. C. C.—Hay and straw shoots.
D. D. D.—Grain and feed bins.
E. E.—Shoots for sliding roots into cellars K. K.
F.—Grain shoot.
G.—Stairway.

This barn was built of concrete or a mixture of broken stone, cement, sharp sand and water. The expense is not accurately known, but it is stated to be cheaper than either brick or common stone. It is used for a large breeding business, but with some modification will suit other purposes.

DOCTORING SICK ANIMALS.

A FINE HORSE, belonging to the writer, once caught a bad cold, and was afflicted with an obstinate and severe cough—so severe that he could sometimes be heard half a mile. The neighbors were liberal with prescriptions; and ashes, blue vitriol, copperas, castor oil, turpentine, glauber's salts, &c., were recommended in large quantities. The owner concluded that all these, if taken, would be quite enough to kill the animal, and it was therefore decided to give him nothing, and take good care of him. In other words, Dr. Physic was dismissed and Dr. Nurse called in. It was early in autumn; and a good clover lot furnished all the food, which, being of this succulent character, served somewhat as an expectorant. Special directions were given never to work the horse enough to cause sweating, and to blanket him carefully after working, or whenever the weather was cold. In short, everything was done to prevent any further catching cold, and to keep him at all times comfortable—giving very moderate labor. In six weeks he was perfectly well. Dr. Nurse proved his skill and efficiency in this case. If the animal had been dosed, worked hard, and treated carelessly, it is not probable that he would have recovered.

In another instance, a horse by hard usage had a bad attack of sweeney. A "horse-doctor" (so called) offered to cure him for $20, by some cutting and slashing process. The offer was declined. He finally reduced his proposed charge to only $3. Had he offered $50 for the privilege of experimenting on the animal, the offer would have been as promptly refused. A new Dutch collar was procured, and only moderate labor permitted. In a year the sweeney had nearly or entirely disappeared.

When animals are violently and suddenly attacked, it may be best to administer powerful medicines; but they will rarely if ever be thus attacked unless through hard usuage. In chronic cases take good care and attend to general comfort, and nature will in time effect a cure. Be very careful to avoid those pretenders known commonly as *horse doctors*.

There is one simple remedy which may be at all times used with safety. This is fresh pulverized charcoal. It can never do any harm, and nothing restores sooner any derangement of the digestive system. Take red burning coals from any wood fire, pulverize them at once in a mortar, and the powder will be ready for use. Mix a teacupful of this powder with a junk bottle of cold water, and pour it down. Horses, cattle, and other animals, which may have been injured by over-eating, or by swallowing bad food, may be readily cured by this remedy.

There is another very safe remedy for all diseases which affect the skin, or begin on the outside, such as scratches in horses, and foul foot in cattle. This remedy is *cleanliness*. Use cold water, or tepid water, according to circumstances, adding soap if necessary. It will have an excellent effect.

Preventives are better than cures; therefore keep all animals in dry clean pastures, or in dry, well littered, well ventilated stables. Never over-work or over-feed. Attend to general comfort in all particulars—protect from cold—feed regularly, and never make sudden changes of food, and you will very rarely have a sick animal.

GRAPE HOUSES.

THE FOLLOWING PLANS AND DESCRIPTIONS of houses for propagating the grape, are taken from the last edition of Thomas' Fruit Culturist, published by Wm. Wood & Co., New-York. These houses were erected at very moderate expense by E. W. Herendeen, and with some modification they may be used for orchard houses or for raising fruit in pots, and for cold or fire-heat graperies, where cheapness and simplicity of construction are desirable.

A plan of the smaller size is represented by fig. 1, and the house is constructed as follows: Set two rows of cedar posts into the ground about two and a half feet deep, and beat the earth about them well—the rows of posts being eleven feet apart, and the posts six feet apart in the row

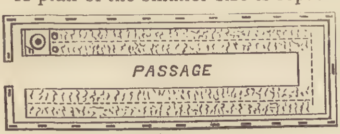


Fig. 1.

—saw the tops off on a level three and a half feet above the ground; board them on both sides and fill in the space with tan or sawdust. Nail to the top of these posts thus sawn off, a scantling two by five feet for a plate to the house. On the inside of the house set two other rows of posts at the same depth as the others, and opposite each one, and at a distance of three feet and four inches from them. These posts are the support of the inside of the tank. Fasten a scantling two by five feet in lengthwise along these posts, and parallel with the plates, by sawing out the posts and letting them into the side an inch or so. The scantling should be about twelve inches from the ground. Run a short scantling from the under side of the long scantlings to the posts supporting the plate, letting them into the posts about one inch, and nailing all securely by using twenty-penny nails. Then put a scantling lengthwise with the house and parallel with the one on the inside of the tanks on the top of the short pieces last mentioned, and near the posts supporting the plate of the house to support the outside of the tank; of course at the same height from the ground. All this frame-work should be very securely made, to prevent the tanks, when filled with water and covered with heavy sand, from settling, as they are sure to do if not well done. The tanks are easily made by using pine plank, an inch and a half thick, planed and matched at the planing-mill, cutting a groove at each end and driving them in paint upon side pieces five inches high. They may be three and a half feet wide, and should ex-

tend on two sides and one end of the house, and be divided lengthwise by a board on edge, which supports the middle of the covering placed over them for holding the sand used for propagating purposes. The water should be three inches deep in the tanks, which for this purpose should be very carefully levelled. These tanks are covered with thin boards, which, when damp, are a good conductor of heat from the hot water below. The sand should be clean building or lake sand—not too fine or too coarse—and about three inches deep for starting grape cuttings.

The larger house (fig. 2) is twenty-two feet wide and seventy-five feet long, and is double, being divided into two parts for heating the propagating beds,

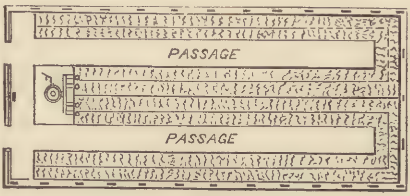


Fig. 2.

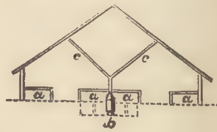


Fig. 3.

but open in one in other respects. The same furnace heats both these parts by branching pipes. A cross section of the double house in shown in fig. 3.

The houses thus constructed are heated by a simple and efficient furnace, made at the locomotive works at Geneva, N. Y. The furnace for the larger house is shown in the annexed figures, where fig. 4 is a view, and fig. 5 a section. It is made of boiler iron, riveted to circular cast-iron plates at top and bottom, with a space within for fire surrounded by water, with the exception of the grate at bottom. The stratum of water surrounding the fire is about an inch thick.

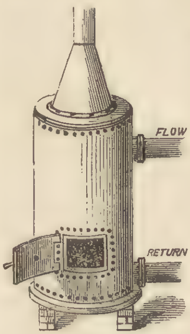


Fig. 4.

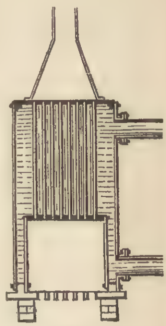


Fig. 5.

Forty-three pipes, from the fire through the upper plate, carry the hot air and smoke to the expanded smoke pipe, and heat the water with great rapidity. The amount of fuel required has been found to be only two-thirds the amount for other heaters in common use.

The size of the boiler for the larger house is about twenty inches in diameter, and three and a half feet high, and smaller for the other house. The hot water pipes connecting with the tanks should be three inches in diameter inside for the small house, and four inches for the larger. Six tons of coal only were used throughout the entire season of spring propagation, for both houses.

TO INCREASE THE PRICE OF FARMS.

VARIOUS MOTIVES actuate different land owners in making improvements. But no appeal can be made to them that will be so generally felt as to urge the importance of increasing the money value of their estates. When we say to them that we have a secret to impart by which they may add five, or ten, or twenty dollars per acre to the price which their farms will bring in market, they listen, as they should do, with interest. It is for the purpose of augumenting their property that their labors and exertions are applied year after year. To some of our readers we shall not impart what is entirely new, when we assert that the planting and successful cultivation of fruit trees, and securing a good supply of the best fruit the year round, will do more towards adding to the real as well as the market value of their places than can be accomplished with the same outlay in any other manner. We ought, perhaps, to add that a portion of ornamental planting should not be omitted; for while fruit trees are valued by every one, the addition of a portion for shade and ornament will certainly increase the attraction given by the more substantial and higher market value of fruit trees and their products.

A purchaser visits a certain neighborhood to select a farm. One of his first inquiries is, is it well planted with fruit? If an affirmative answer can be given, he may be induced to pay several dollars more per acre, amounting to five hundred or a thousand dollars for the whole farm—while the trees and planting have not cost more than one hundred and fifty.

There is another consideration of a higher character, namely: the influence of home attraction to the owner's children—an attraction which may prove the turning point between a life of usefulness, industry and domestic enjoyment on the one hand, and of a roving, restless, and perhaps immoral character on the other. But our object at the present moment is to point out the money value of these improvements. The farm will bring a higher price, because it is worth more. Fresh fruit, constantly on hand, will save many dollars yearly in family supplies, and the surplus may perhaps yield a few hundred dollars by marketing. But there is still another point of profit. The owner probably has boys whom he has endeavored to educate to usefulness, and who he expects will assist him when they grow up, and perhaps take charge of the farm. Now let him figure for a moment between the amount which he would be likely to realize in ten years from his land, if he should be compelled to do all his work, and a part of the superintendence by means of second or third rate hired men on one hand, or through the energetic and careful management of his own sons, in the prime and vigor of their manhood, on the other. If farming is made repulsive to them by placing them on a piece of land without a single fruit or ornamental tree, and which will only raise crops of wheat and corn, they will

be likely to leave the pursuit and try their hands at trade or speculation, or something worse.

It happens, unfortunately, that many who admit the value of plantations of fruit trees, do not use the right means for securing their best advantages. Trees are planted without order or method, scattered in various places where the ground can be best spared for them—along lines of fences, or in corners of door-yards, where it is impossible to give them adequate cultivation. They are overgrown when young, with weeds and grass, and make but little progress; and perhaps their struggles for existence are ended in a few years by the girdling of mice. All this failure might be prevented by selecting, not the worst piece of ground, but the best that can be had for the fruit garden. In order to prevent the incursions of still another enemy—namely, fruit stealers—the piece of selected ground, which may be from two to five acres in extent, should be surrounded by a thorny hedge. This hedge may be Osage Orange, where the climate is not too severe; or honey locust, in colder latitudes. Let this hedge be well made by planting evenly, in well prepared mellow soil, uniformly selected and healthy plants, to be cultivated well for several years, and properly cut back, so as to produce a thick and impenetrable barrier. If this hedge is planted with the fruit trees, it will be of sufficient size by the time they come into good bearing. The inclosed ground will have vacant space enough for garden vegetables and melons, and the latter will be secured from pilferers by the surrounding hedge.

Such a fruit garden as this, properly filled with well selected and thoroughly cultivated trees, would be a source of profit as well as enjoyment almost beyond estimate. Fresh fruits on the table from the first or second week in summer till the following spring, after having been once enjoyed, would not be readily parted with by any intelligent cultivator. The pruning, training and general charge of such a plantation would furnish delightful employment to boys, young men and the veteran farmer. Propagation by grafting, budding and layering, and by seeds, would always afford amusement and instruction. Even an acquaintance with insects and other depredators would add to the interest, in connection with the study of Natural History.

To recur to a remark at the beginning of this article—suppose a farm purchaser desires to find a place to settle—would he not be far more likely to select a neighborhood or region of country where such admirable provisions for comfort as we have described could be found on every hand, than in a neighborhood where there is little intelligence, where everything of the kind is disregarded, and where rough grounds and rough farms, without the ornament or luxury of a tree, are only to be seen? A moment's reflection would satisfy any one that nothing could add more to the pecuniary value of the land in such a region than the general adoption of the improvements we have recommended. We trust that those who have heretofore failed to give sufficient practical attention to this subject, will now determine that another season shall not escape without their commencing the work in earnest.

STONE WALLS.

GOOD SPECIMENS OF STONE WALLS are ound on the farm of GEO. GEDDES, near Syracuse, N. Y. The water limestone which underlies this farm furnishes abundant quarries of an excellent building stone, which has been used to great advantage in the construction of the farm fences—many miles of which have been built, forming excellent and durable subdivisions of the fields. These walls are about five feet high when completed, but settle a few inches into the soil in the course of years. To prevent this settling, and also to preserve from distortion from the effects of frosts, the walls are built on broad flat stones, (which this rock supplies in abundance) projecting a few inches on each side from the bottom. Fig. 1 represents a cross section of this wall, showing the flat base stones with the wall resting upon them. It is about two feet thick at bottom, and one foot at top, and is surmounted with what is termed Scotch coping—made by placing flat stones on edge, in a sloping position, as shown at the right hand of the engraving. It will be observed from the section that a sufficient number of broad, flat stones are placed in the wall to extend through it and bind the parts well together. The rock is so easily quarried, that, before the war, it was done for about twelve and a half cents for a cubic yard. The builders are now paid a dollar per rod in length, and the additional expense of delivering the stone on the ground hardly brings the whole sum up to two dollars per rod.

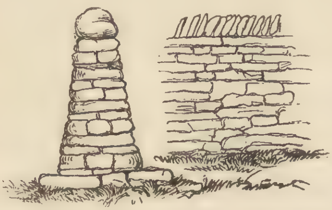


Fig. 1.—*Farm Fence of Water Limestone.*

The farm of E. B. UNDERHILL of Westchester Co., N. Y., furnishes fine specimens of stone wall building. While many others on adjacent places were distorted or tumbling down from the effects of frost, all these remained straight, even and perfect—being set in sufficient trenches filled with small stone, on which the walls were built. In mucky or wet places these trenches in some cases were several feet deep, affording drainage to the land, as well as support to the walls resting on them; the larger blocks of stone, many of them weighing one or two tons, were placed at the bottom, which was generally three feet and a half to four feet thick—the top was two feet thick, and finished with flat stones extending across. The height varied somewhat with the surface of the ground, so as to make the top a smooth, straight, or handsomely curving line. Some of these walls had been built thirty years, and remained even, unimpaired, and unaffected by frost.

Fig. 2 represents imperfectly the manner in which the joints are

carefully broken in building these walls; and fig. 3 is a cross section of the same. Figs. 4 and 5 show respectively, badly broken joints, a few specimens of which are occasionally seen elsewhere. I estimated the

Fig. 2.

Fig. 3.

whole of these farm walls over five miles in length. Being of granitic character, they are not so easily worked as softer stone, but are more perfect and durable. The cost of laying has been about three dollars per rod,

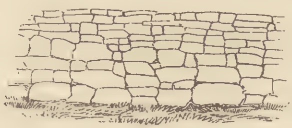


Fig. 4.

Fig. 5.

in addition to drawing off the land. The cost would be more at present prices. During the early part of the war, when labor was cheap and owners were afraid to expend much capital, the proprietor of this place employed a considerable number of men, and made some of his best improvements.

WALL AND BOARD FENCE.

In many localities it is desirable and convenient to build a fence, the lower portion of which is stone and the upper of boards. I do not know of one that possesses so many advantages as the one shown herewith. The posts, B B B, are made from plank 2 inches thick and 1 foot wide, and of any length to suit the height of the fence. The portion above the wall is tapering, as shown in fig. 1. R is a board six inches wide, the lower edge of which is nailed on the post, two and a half feet

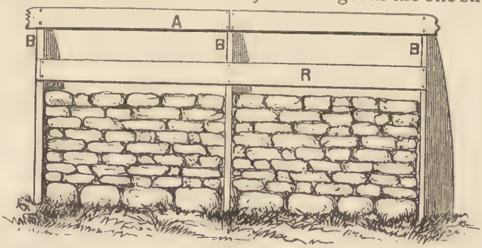


Fig. 1.

from the ground. A is a board four inches wide, and placed eight inches from the lower one.

Directions for Building a Fence.—First, set the posts B in the ground; two feet will be about the depth; nail on the boards, or the upper one at least, when you are ready for laying up the wall. The nearness of the posts to each other and the width will enable you to use a great many round or cobble stones in its construction, with a certainty of their remaining.

The superiority of this fence over the common round post and wall fence, consists in—1. The wall never falls or tumbles down around the post, as they are laid between, and not around the posts. 2. The post *never* heaves by the action of the frost, as the stones in the wall hold it with the power of a vice, so to speak. 3. I consider this the only cheap and durable plan by which a half wall fence can be constructed, and it looks neat and is substa tial, as I can testify from examination.—L. D. SNOOK, *in Co. Gent.*

RURAL ECONOMY.

TO MAKE WAGONS AND CARRIAGES LAST LONG.—Keep them clean and well screwed up. A carriage allowed to become dirty, loses its paint, cracks, admits water and decays. If dirt is permitted to collect on the hubs, it works inside, mixes with the grease, and grinds out the works. The wheels soon work loose and the evil increases. If the nuts work loose, the parts rattle, wear out, or break. Place a wrench on every nut, if the wagon or carriage is in use, as often as once a week. Keep all parts well washed, well painted, and well varnished. Always place them under shelter when not in actual service.

LEAKS IN ROOFS.—During hot, dry summers, wood contracts, and leaks are often made in roofs. The trap-door at the house-top was thus made to leak badly. The carpenter proposed to batten it; but the writer directed that white lead paint, having enough fine, clean sand mixed with it to become about as thick as buckwheat batter, or thin mortar, should be put in the cracks, and not a drop of water has since passed them.

WEEKLY EXAMINATIONS.—Every farmer should so arrange his work that he can spare time enough once a week to go all through his barns and outbuildings, and see if anything is out of order. The best time is at the beginning of the week, for he then has no unfinished jobs on hand that must be completed before the Sabbath. In one place he will find a door with a broken hinge; in another a sleigh standing on damp earth; and again he will discover a tub with a hoop falling off, &c. "It will take much time?" Then take it—it will be the best spent hour, or half day, if necessary, that the owner spends. If he cannot make repairs on the spot, take his memorandum book in hand, and note everything requiring attention; and he can then call on a mechanic.

Balky Horses.—They refuse to move forward, with a dogged obstinacy, and seem to say, "I would rather go backward—I shant stir forward a step." Take them at their word; hitch a team to the back end of the wagon, and start up in the reverse direction, drawing the balky animal in the way of his choice. He will soon regard it as a poor joke, and prefer going ahead in the natural way.

Facing Board Fences.—A valid objection is made to the practice of nailing upright facing strips of board against the posts, after the horizontal boards are on—that they retain water, and cause the ends of the boards to rot before the rest. A better way is to omit the facing for many years, or until decay begins on the inner side of the boards next the posts, in consequence of the water retained on that side. After the boards have become loose, and have been repeatedly nailed on again, then is the time to apply the facing. Any strips of board about four feet long, and four or five inches wide, will answer. We have known fences that had stood about twenty years unfaced, and then begin to give out, made strong and firm for several years more by facing.

Loads for Teams.—Teams are sometimes permanently injured by overloading, in consequence of an ignorance of the quantity of some new material to make a ton. Every person, or at least every owner of a team, should therefore acquaint himself with the relative weights of different materials. With straw no one need have any fear, and hay is next—a load of timothy twelve feet long, seven feet wide, and six feet high, well packed, weighing about a ton, or about 500 cubic feet in a solid stack or mow. Four and a half cubic feet of iron weigh the same, and a wagon box ten feet long and three feet wide, should therefore be filled only two inches to make over a ton. Sand may be put in the same wagon box to a depth of 10 inches, moist earth 9 inches, loose gravel 11 inches, and brick about 9 inches.

Freezing Pumps.—Pumps exposed to freezing are now usually made with contrivances to let off the water—one mode being to make a small hole in the pipe a few feet below the exposed part, so that the water will always run off before freezing. This hole may be stopped at other times of the year. Another way, which may be adopted for any pump, is to place a small nail or carpet tack under the leather of the fixed valve, which will cause it to leak and let off the water. It is well where pumps are liable to freeze to keep a small lead pipe or other tube, with a funnel, always on hand. Place this tube on the ice in the pump, and pour in hot water at the top. The tube carries the hot water directly on the ice, and it melts with great rapidity—a foot or more a minute—ten times faster than in any other way.

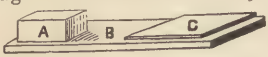
Profits of Planting.—A few far-seeing, shrewd land owners are now making extensive plantations of timber. Others will follow in twenty or thirty years, and say—"We are twenty or thirty years too late. If we had planted then, we might have had a fortune now." Timber will be no cheaper. The Duke of Athol, as is well known, made vast plantations of timber—over 10,000 acres, in Scotland. It is now asserted that the timber from these trees would bring, if sold under the hammer, the enormous sum of $50,000,000.

Good and Poor Horses.—It costs no more to keep a good horse, one that will do a heavy day's work with ease—than a poor one with more bone than muscle, and hard to keep in order. A good, well chosen team, compactly built, easy keepers, &c., well taken care of, will do one-half more work each day than a bad or common team. Good horses will, of course, pay the interest on the whole cost several times over, and be far cheaper than the others. It will therefore do to pay a hundred dollars or more additional on them. A man, whose labor costs $300 for the season, will accomplish far more with the fine animals than the cheap ones.

Binding Corn Fodder.—The strongest and cheapest material for binding up stalks, is the osier willow. The true sort, used by nurserymen, is almost as tough as rope. It grows easily from cuttings on any rich soil. A row of it two or three rods long, occupying not one square rod, will afford enough to bind ten acres of corn. It should be cut back to the ground every autumn, or else very early in spring, to keep it young and fresh.

DOMESTIC ECONOMY.

ANNEXED IS SHOWN AN IMPROVED KNIFE-BOARD. The board B is three feet long by one and a half wide. A is a scouring brick made from fine clay—an excellent article for the purpose—can be had at all grocers'. C is a piece of buff leather nailed or firmly attached to the board as shown. It is well to nail a half-inch strip on the edge of the board, to prevent the sand, &c., from falling off.



Knife-Board.

This board occupies but little space, is cheaply and quickly made, and will be found to answer the purpose admirably. A high polish can be given to the knives by a few strokes over the leather.

Pulverized Charcoal is an excellent remedy for many purposes, and should be kept in every house. A glass jar with a wide mouth, and cork to fit it closely, is best to keep it in. A half pint or so is large enough for most practical purposes. The coal should be freshly burned, and of such a character as to pulverize finely in a mortar, without leaving grit. Most kinds of *hard wood* are too hard, and bass-wood and pine are too soft and dusty. We have never found anything equal to the "white wood" of New-England, or the Tulip tree. Perhaps soft maple would do. Take a stick large enough to make the desired coal, place it in the fire till it just ceases to blaze, and then pound or bray the red coals in a mortar—which will, of course, immediately extinguish the fire. Place the powder in the jar or bottle, and keep it corked tight. It is excellent for indigestion, or any derangement of the stomach—a rounded teaspoonful is a full dose, and should be mixed with several times its bulk of water, and swallowed. The powder is excellent to rub the teeth with daily. We once tried it on a six months calf that had become fearfully bloated from over-eating green food.

Saleratus was first given, but it could not be swallowed. Half a teacup of charcoal in water was then administered without difficulty from a junk bottle, the head being held up. In six hours the animal was perfectly well. All agreed in the opinion that without this treatment it would certainly have died.

WHEN A HOUSE TAKES FIRE remember that the first thing is to *close all doors and windows.* This prevents currents, and prevents the fire from spreading from room to room. A neighbor's fine two-story dwelling was found on fire in the dead of night, and the family, scarcely dressing, ran frantically through the building, leaving all the doors open. In ten minutes all was a sheet of flame. Had the doors been kept closed, the fire might have been perhaps checked till it was extinguished, or at least admitted the removal of furniture. Remember then, and impress it strongly and vividly on the mind, as soon as a house takes fire, to *keep the doors closed.*

WHEN A CHIMNEY TAKES FIRE from a superabundance of soot, and danger is threatened, throw salt or a wet blanket on the fire below, and close it above and below to prevent a strong current of air, and it will burn out the soot slowly.

AVOIDING COLD WINDS.—Those who have to ride in cold winds in winter, and who do not happen to have sufficient clothing at the time, may protect the lungs or chest by placing a doubled newspaper in front, and then buttoning the coat over it. It will be found to have a remarkable protecting power against the cold. Those who do not happen to have sufficient bedding, and who take some one of the great blankets called fashionable newspapers, may protect themselves on very cold nights, by spreading one or more between the quilts. Travelers should take a few with them for this purpose.

OILING CARRIAGES.—The oil used for this purpose should have body enough to last some time, and for this reason castor oil is one of the best. In applying it run the oil can lengthwise with the axle, on the top, and put a little in the oil chamber in the box. If the axle is always wiped clean before applying the fresh oil, it will remove grit and make it last longer. A person who has used lard a great deal for iron axles, thinks that although it runs off rather slower in hot weather, it is not so lubricating as castor oil.

LOOSENING SCREWS AND STOPPERS.—A knowledge of the fact that bodies expand by heat, and an application of this knowledge, will often save much trouble. Ground glass stoppers in bottles often become fast by being put into the necks after the latter are warmed by the fingers, the stoppers being cold. To loosen them, warm the necks by applying a small cloth dipped in hot water, which will expand it and loosen the stopper. Nuts on thrashing and other machines sometimes become immovable by being put on the screws in cold weather after the nuts have been warmed by holding in the hands. The only way to get them off is to expand them again by heating. The work should be quickly done, otherwise the screws will also become heated and expanded. We once saw three strong men trying to unscrew a rusty iron pump. We suggested heating the outer or hollow screw, when it was loosened with one hand.

CANE MILLS.

SINCE IT HAS BECOME SO COMMON WITH FARMERS to manufacture their own molasses in the form of sorghum, some good contrivance for expressing the juice has become very desirable. Fig 1 represents a sugar mill of the kind, to be placed over a barrel and driven by hand. The fly wheel makes the work comparatively easy. The hopper is represented as lifted off to show the rollers and gearing. The whole, without the barrel, holds about ninety pounds. The rollers are about eight inches in length, and four in diameter. This mill is mostly intended for common sugar cane.

For expressing the juice of the sorghum by horse power, which is generally adopted, the horizontal mill represented by fig. 2, answers a good purpose, and is one of the best in market. It possesses the advantage of convenience in feeding, with strength, lightness and cheapness. The rollers are about ten inches in diameter. It will be found useful in the South, and all sugar raising countries where only a limtied quantity of cane is ground. The mill is made of three sizes, with wood or iron frames. The cut shows the medium size. The entire weight of this size is six hundred pounds.

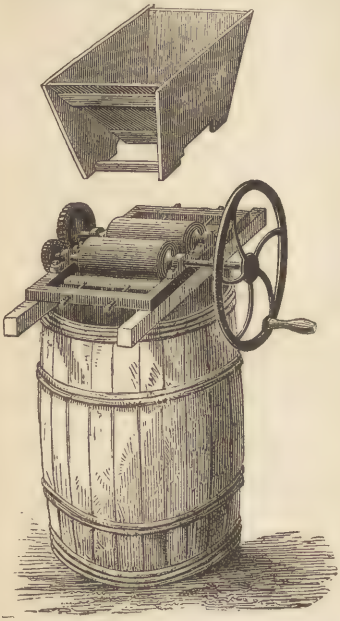


Fig. 1.

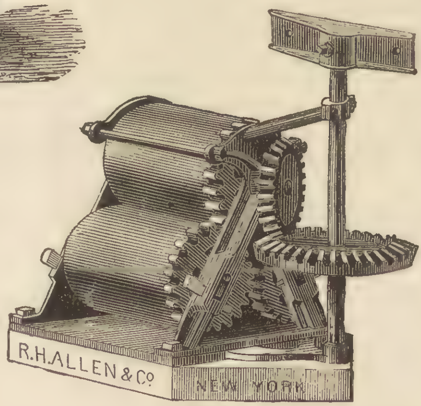


Fig. 2.

ARITHMETIC IN FARMING.

A FREER USE OF THE MULTIPLICATION TABLE would enable farmers to act with more precision in many operations now conducted entirely by guesswork. We have frequent inquiries, for example, as to the proper amount of certain special manures to be applied per acre for different crops; but the use being new, the application is made without any guide as to quantity, and too much is used in one case, and too little in another. One man injures his crop and wastes the material by overdosing; another uses too little, and does not witness any sensible effect. A little figuring would obviate these difficulties, and enable the farmer to calculate accurately beforehand just how much to apply. Suppose, for instance, that he proposes to use superphosphate at the rate of 500 pounds per acre in his turnip drills. Instead of trying at random, and coming out wrong, as he will be sure to do, let him bring his work down to figures, in the following manner: His drills, we will suppose, are 28 inches apart, amounting to 1120 rods in length on each acre, or at the rate of about seven ounces per rod. Or, to be more acurate, as well as to take a more convenient length, the fertilizer should be strewed along the furrow at the rate of one ounce to two feet and two inches in length. Weigh out a small quantity in ounce portions, and practice it a few minutes by strewing it along a furrow so that each ounce shall reach a measured length of two feet and two inches. A little practice will enable the operator to apply the fertilizer so that he can distribute the required quantity over the acre or field with much accuracy. If he wishes to use only half this quantity, or two hundred and fifty pounds per acre, strew it so that an ounce shall extend four feet and four inches, and he will accomplish the desired purpose.

If a fertilizer is to be applied in hills, as in a cornfield, a similar mode of calculation may be readily adopted. Hills three feet and a half apart each way will be at the rate of about 3500 per acre, requiring about two ounces per hill, if 500 pounds of the fertilizer are used, or one ounce for 250 pounds.

In sowing plaster by hand at the rate of a bushel or 100 pounds per acre, the operator should only take the tenth of a pound for each handful, for if he covers a space five by ten feet at each throw, it will take nearly one thousand to go over the acre, as a little figuring will prove.

The same mode may be used to determine the amount of grass seed for each handful in sowing broadcast. Each throw will cover, as before, from five to ten feet, and whatever quantity is used for an acre should therefore be divided up into about a thousand parts. A peck of clover seed, for example, weighs fifteen pounds, and to cover an acre, each handful should be a little less than the fourth of an ounce. The previous use of a pair of scales for weighing off a few of these portions would enable the operator to hit at once, with considerable accuracy, the right quantity, in-

stead of being compelled to make random guesses for days, or even years, before acquiring proper experience.

It is often regarded as an indication of shrewd guessing when the farmer brings his domestic animals through winter on the exact supply of fodder which he has stored away for this purpose. Sometimes he may find towards spring that he has many tons of surplus, and perhaps, more frequently, that he has to purchase a considerable amount in order to "piece out" the winter supply. Measuring, weighing and calculating, the work of a few minutes, will obviate much of this uncertainty. The farmer who frequently weighs a load of hay acquires sufficient experience in estimating, to determine very nearly, from a record of the size and number of the loads which he draws into the barn, the whole amount which he has on hand for winter. If he has neglected to do this, he may hit the amount nearly as well by measuring his bays and allowing an average of 500 cubic feet per ton of timothy, 600 feet if part clover, or 700 feet if all clover. He will thus be able to learn, very nearly, how much hay he has on hand. The next question is to know how much his animals will eat. If he has provided good racks, to prevent them treadiug hay under foot, and has given them fair shelter, he may adopt the following rule with a good deal of certainty: Determine the weight of his animals, and allow three per cent. of the weight of his horses for their daily food in hay, and two and a half per cent. for cattle. Multiply this daily allowance by the whole number of animals, and again by the number of days which he expects to give them dry food, and then compare it with the quantity on hand, and he may strike the balance, one way or the other, with considerable certainty.

Every farmer should have a tape line, or other means for measuring his fields. If he has had much experience in pacing, he may indeed make temporary measurements with some degree of accuracy, but he should frequently correct such rough work with the tape line. A cord or garden line will do tolerably well to measure with, provided its length is frequently corrected by the use of an accurate ten-foot pole, and taking care that it is not shortened afterwards by dragging through wet grass, or lengthened by stretching, or by exposure to a hot sun on a dusty surface. Pieces of red yarn may be sewed through it to mark rods and feet. Every field should be measured, so that the owner may know the number of acres, and a record should also be made of its length and breadth, that the amount of land plowed in a day may be readily reckoned, and the contents of each "land" definitely known. Among other advantages, this accuracy will enable the owner to determine easily acreable products under different modes of management, and to acquire a great deal of valuable information in a few years as to the most profitable way of raising heavy crops.

There are many other modes, which will suggest themselves to the intelligent farmer, for adopting the weighing and measuring system, and submitting his work to accurate figures, instead of to loose and random guessing. Every granary should have a graduated scale inside, to show

at a glance the number of bushels at any height. A similar measurement and record should be made of his wagon boxes. These he may do by measuring the length, breadth and depth for the cubic feet. Then divide the number of cubic feet by 56, and multiply by 45, and the result will be struck measure. Or he may allow 2,150 cubic inches for each bushel, or add one-fourth for heaped measure, as for potatoes, corn in the ear, &c.

PLANTING CORN IN DRILLS.

OUR READERS are aware that we have occasionally urged the superiority of the practice of planting corn either in drills or in small hills thick in the row, where the highest amount of product is the object. The average increase, in a number of observations and experiments in drill or thick hill planting, has been about 25 per cent. John Johnston says that this increase much more than overpays the slight additional cost of labor in hoeing, and nearly doubles the cornfodder. We find our views endorsed in a recent article in the Clyde Times, with the signature of "W.," which we recognize as that of Joseph Watson, well known as an intelligent and successful farmer. He states that he has used Emery's corn planter for twenty years, and finds it a labor-saving implement, planting eight acres a day, and enabling him to put in his crop promptly and in season, even if there happens to be at the time a scarcity of farm laborers. He remarks that the object of planting rows both ways, is not equal in practice to the importance attached to it in theory, and then adds some reasons of the "row-one-way system," in addition to those which we have formerly given, and which necessarily result from the use of a planter or drill. He states in substance that while the plowing of the sod is going on, which should be done with a strong team, a lighter team may be employed to harrow the freshly turned earth as fast as each "land" is completed, and the corn planter follow immediately after. This obviates the necessity of waiting till the whole field is completed for cross working and planting in the old fashioned way—when the soil, perhaps, has become dry, and many days lost by the delay. The rows thus planted by means of the drill will be either straight, or contain no short crooks; and hence the cultivator may be run close to the rows, and lessen the amount of hand-hoeing. Another advantage is, the hoes may follow immediately after the cultivator while the earth is fresh and mellow; and any stalks accidentally covered are immediately relieved and set up, without leaving them partly prostrated several days, as in the old practice, until the cross cultivation is commenced. He further adds that he prefers the drill with its one horse, to any five men planting by hand and hoe, even after the whole field has been marked both ways; and that none of his neighbors raise greater crops of corn or at so little expense per bushel.